# PHYSIOLOGICAL AND PSYCHOLOGICAL ILLNESS AND SYMPTOMATOLOGY REPORTED BY THE VIETNAM VETERAN IN NORTHERN UTAH: WHAT ARE THE EFFECTS ON HEALTH CARE UTILIZATION?

by

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ABSTRACT

This research explores the present physiological and psychological health state of the Vietnam veteran as it relates to health care utilization. Additionally, health is examined for symptoms/illnesses that have been associated with dioxin exposure. Dioxin was a toxic trace contaminant of Agent Orange, the most widely used herbicide employed by the United States for defensive purposes in Vietnam between 1965 and 1970. Since 1978, Vietnam veterans have been reporting nonspecific patterns of symptoms that some researchers have linked to Agent Orange exposure. The research explores the present pattern of reported physiological and psychological symptoms/illnesses as they occur over three time periods: before, during, and after Vietnam service.

Fifty-three subjects, drawn as a convenience sample from Vet Outreach Center clientele in three Northern Utah cities, were asked to complete a questionnaire. Data collection occurred over an 11 week period.

The majority of respondents were combat veterans who had served in Vietnam between 1968 and 1971. Nearly half had been stationed in one or more areas that had received potentially heavy spraying with Agent Orange.

A variety of symptoms were reported in the various physiologi-

cal systems of the body and were found to increase steadily from the "before Vietnam" to the "during Vietnam" period as well as from the "during Vietnam" to the "after Vietnam" time period. This pattern of change was also found in the physiological potential Agent Orange exposure symptoms. The large mean number of psychological symptoms reported for the "after Vietnam" period suggested that many respondents are experiencing symptoms of depression, post-traumatic stress disorder, and/or psychological symptoms of potential Agent Orange exposure.

Three-quarters of the sample reported a health care visit in the past year. The most widely used health service reported was mental health care. The majority of respondents were occasional users of Veterans Administration (VA) facilities. Use appeared to be related to VA disability classification. The small percentage of respondents who reported no use of VA facilities over the past three years cited distrust of the VA, ineligibility, and lack of medical indigency as reasons.

Using Kendall's Rank Order Correlation Coefficient, the total number of reported post-Vietnam symptoms/illnesses showed no significant association with combat, interval since last health care visit, or self-rating of health. The total number of post-Vietnam potential Agent Orange exposure symptoms reported demonstrated no association with Agent Orange knowledge and beliefs or level of potential Agent Orange exposure of military station.

The prevalence of certain physiological and psychological symptoms in patterns of increasing occurrence in the Vietnam veteran

indicate the need to further investigate the roles of Agent Orange and posttraumatic stress disorder in determining the Vietnam veteran's present health state. Further research is also needed to explore the effects of psychosocial adjustment on present symptoms/illnesses. Health care providers in the private sector and the VA need to familiarize themselves with the types of potential physiologial and psychological symptoms/illnesses reported by the Vietnam veteran in order to plan health care facilities appropriate to his needs.

CONTENTS

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# CHAPTER I

## INTRODUCTION

In the last decade, a great body of literature has been devoted to the discussion of the Vietnam War and the soldiers who fought it. It is widely accepted that the Vietnam War differed from other wars in a number of significant ways. Two of those differences stand out from the rest. Politically, the war lacked a strong ideological justification in the United States. In 1964, United States troops entered the war purportedly to save South Vietnam from Communist aggression (Wilson, 1980). However, by the late 1960s, a large number of the Vietnamese people perceived the United States to be as great a threat as the Communists. Militarily, the war was distinguished by guerilla warfare. This meant that it was impossible to separate friend from foe as there was never any front line (Wilson, 1980).

A number of researchers suspected that, if the circumstances of the Vietnam War set it apart from other wars, the Vietnam veterans, who numbered over three million (Figley, 1980), might have been experiencing unique problems in the aftermath of the war. However, only a few researchers actually sought to compare the characteristics of Vietnam veterans with veterans of other wars (Braatz, Lumry & Wright, 1971; Dickman & Pearson, 1972). The

latter two teams of researchers utilized Veterans Administration (VA) psychiatric inpatients in their samples and found no significant differences between Vietnam veterans and veterans from other wars.

Until 1977, the bulk of the literature about the Vietnam veteran was devoted to symptoms of psychological illness, often in conjunction with psychosocial adjustment postdischarge from the service. Perhaps this interest reflected a sense of national guilt concerning the "forgotten warrior," the soldier who slipped back into the country with no fanfare and subsequently was reviled by "hawks" and "doves" alike. The "hawks" perceived him as "the guy who lost the war," while the "doves" saw him as a killer of babies (Figley & Leventman, 1980; Lifton, 1973).

While some researchers (Lifton, 1973; Shatan, 1978) cited patterns of psychological problems from personal interviews with Vietnam veterans, others (Bourne, 1970) congratulated the military for the unusually low number of psychiatric casualties encountered during the war. Irrespective of their individual opinions, the consensus of the research community was that, if any Vietnam veterans were experiencing psychological difficulties, they were in the minority.

There was no disagreement within the scientific community concerning certain similar physiological characteristics of the Vietnam veteran population. The military technology used in the Vietnam War had contributed to an increase in limb amputations and spinal cord injuries among Vietnam veterans. Advances in field

medicine had allowed these soldiers to survive, where they would probably have perished in previous wars.

Public concern for the Vietnam veteran's postwar health status may well have slipped from the national consciousness, were it not for a television documentary produced in March 1978, by a Chicago-based CBS affiliate entitled, "Agent Orange: Vietnam's Deadly Fog." The chief reporter in the documentary had been contacted by an employee of the VA Hospital in Chicago, who had been interviewing Vietnam veterans seeking disability claims for several years. She had noticed a pattern of symptoms among these veterans that included skin rashes, numbness of extremities, decreased memory, and depression. The veterans reported a recent onset of symptoms, that commonly followed a period of weight loss. Many of the veterans also stated that they had children with birth defects that had been born post-Vietnam. The common thread that linked these veterans was that all recalled being sprayed with herbicides in Vietnam (Thomasson, 1979).

The United States employed a number of herbicides in Vietnam from 1962 to 1971 (Appendix A) with the two-fold purpose of destroying enemy ground cover and enemy food crops. Between the years 1964 and 1970, the most widely used herbicide in Vietnam was a 1:1 mixture of the domestic phenoxy herbicides 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), known commonly as Agent Orange. A routine study of pesticide safety by the National Cancer Institute in 1969 led to the discovery that 2,4,5-T contained a highly toxic trace contaminant

known as 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) or, simply, dioxin. The TCDD had teratogenic effects in pregnant mice (Courtney, Gaylor, Hogan, Falk, Bates & Mitchell, 1970). As a result of this research, Agent Orange use in Vietnam was suspended in April 1970. The Department of Defense (DOD) did maintain that American troops were not in danger of herbicide exposure because they had not entered an area until defoliation had been completed, which was four to six weeks later (Report by the Comptroller General, 1979). It was later discovered that this DOD allegation was inaccurate. In 1979, the General Accounting Office (Report by the Comptroller General, 1979) undertook a study of the relationship between troop deployment and herbicide missions. By utilizing the DOD's HERBS tapes (computer tapes that accounted for 86% of the herbicide missions flown in Vietnam from 1965 to 1971), the General Accounting Office found that a substantial number of Marines stationed in the I Corps section of Vietnam from 1966 to 1969 were in or close to areas sprayed with Agent Orange on both the day of the spraying and within four weeks afterward. A similar comparison between Army troop deployment and Agent Orange missions was not possible because of missing records that resulted from rapid Army troop withdrawal.

Although a substantial amount of research had been done on the effects of dioxin on laboratory animals following the release of the National Cancer Institute's report, most researchers were reluctant to apply laboratory results to a human population. These feelings were summed up by Moore in the following Congressional testimony:

> Although dermatologic, internal, and neurobehavioral toxic effects have been observed in animals treated with TCDD, this is not easily extrapolated to humans. Because TCDD persists in the body for a prolonged period of time, disease efforts can be the result of low-level chronic exposure (Moore, 1979, p. 4).

Irrespective of the scientific community's position, or lack thereof, on the risks of Agent Orange exposure, the veteran compensation claims continued to mount in VA regional offices around the country. By February 1981, a total of 6,164 disability claims that had been attributed by veterans to Agent Orange exposure had been processed by the VA (Daschle, 1981). Categorization of the symptoms/illnesses into body symptoms is illustrated in Table 1. Of the total claims received, 5,030 alleged more than one symptom/illness.

Over a period of two and one half years, the VA has allowed only five claims. It insists that there has been no epidemiological investigation that links Agent Orange exposure in Vietnam to current health defects in veterans. However, the VA has provided a screening examination since 1978 for any veteran who suspects he may have been exposed to herbicides (Veterans Administration, 1979).

Sensitive to public accusations that it has been inattentive to the needs of Vietnam veterans, the VA has cited its 1971 administrative seminars, that were conducted in cities around the country, as evidence of its good intentions toward Vietnam veterans. The seminars were designed to delineate the characteristics that distinguish the Vietnam Era veteran from the rest of the veteran population and to discuss the implications of these characteristics for the Vietnam Era veteran's health care requirements (The Vietnam

Table 1

Categories of Symptoms/Illnesses Attributed by Claimants to Agent Orange Exposure

| Symptoms/Illnesses | N |
|---|---|
| Skin condition (acne, alopecia, keloids, and urticaria) | 2,941 |
| Nervousness, headaches, and fatigue (alleged) | 2,668 |
| Paralysis and numbness and other symptoms of extremities | 913 |
| Gastrointestinal and genitourinary conditions | 735 |
| Malignancies (leukemia, lymphoma, melanoma, etc.) | 363 |
| Impaired sexual activity (alleged) | 307 |
| Eyes, ears, nose, throat pathology | 409 |
| Lung condition | 276 |
| Cardiovascular and hypertension | 219 |
| Miscellaneous | 134 |

Note. Adapted from Daschle, 1981.

Era Veteran, 1971).

Whatever the reasons, the use of VA facilities has been low in the last 20 years. Starr (1973) cited 1965 figures from the National Center for Health Statistics that indicated only 14.6% of all veteran hospitalizations occurred at a VA facility. A number of authorities suggested that more recent estimates of VA utilization, that would reflect the use of the Vietnam Era veteran, could be even lower. Low statistics of VA health care utilization have suggested that the majority of veterans utilize the health services of private practitioners and facilities. However, there have been virtually no articles devoted to Vietnam veterans health problems in health professionals' journals.

In March 1981, the results of the first comprehensive VA-sponsored investigation of the combined physiological, psychological and psychosocial problems of the Vietnam veteran were released (Egendorf, Kadushin, Laufer, Rothbart & Sloan, 1981). The research took eight years to complete. The findings confirmed the existence of long-term stress reactions in a certain percentage of Vietnam veterans. The delayed stress reactions correlated with combat exposure. Combat exposure, in turn, was associated with alcohol and drug use, arrests, and medical problems. The study made no mention of Agent Orange or other herbicides used in Vietnam.

Any thorough exploration of the health state of the Vietnam veteran must include an investigation of the physiological, psychological, and psychosocial attributes of the Vietnam veteran population. After drawing a portrait of the Vietnam veteran's health

state, the researcher would then be equipped to examine his health needs and the degree to which they dictate his utilization of health facilities. Since research of such complexity would require the support of a federal grant, a number of years may pass before such an investigation is conducted. In the interim, an exploratory study to examine these variables in a small population could be valuable in identifying the Vietnam veteran's needs for health care on the local level.

## Purpose

The original purpose of this research was to explore the Vietnam veteran's present physiological and psychological health as it relates to his psychosocial adjustment. Changes in the veteran's health state were to be assessed over three time periods: before, during, and after Vietnam. This was intended to illustrate patterns of symptomatology and illnesses that commonly occurred first in Vietnam and continued following return. The veteran's symptomatology and illness patterns would then have been examined for any relationship that might exist between these patterns and Agent Orange exposure and/or combat. After having explored the veteran's health state, his pattern of health care use would have been examined. This information would have allowed the researcher to assess the extent to which the community was meeting the veteran's health needs.

After preliminary analysis of the large number of variables, the researcher became acutely aware that the scope was overly

ambitious. Subsequently, the researcher divided the study into two parts. The first part explored the physiological and psychological aspects of the Vietnam veteran's health over the three time periods identified above. Since the researcher assumed that the war may have been a pivotal point in the veteran's health history, the roles that combat and Agent Orange exposure may have played in determining the veteran's present health state were explored. Additionally, the researcher addressed the types of health services that the Vietnam veteran is using.

In the second part of the study, the psychological symptomatology reported by the Vietnam veteran was examined for patterns of depression, posttraumatic stress disorder, and potential psychological symptoms of Agent Orange exposure. A comparison was made between the number of potential physiological Agent Orange exposure symptoms present in veterans with posttraumatic stress disorder and depression and those with potential psychological symptoms of Agent Orange exposure.

The veteran's psychosocial adjustment was explored in relationship to his total number of reported physiological and psychological symptoms, his demographic characteristics, and his military service. The comparative influences that psychosocial adjustment and total numbers of reported physiological and psychological symptoms have in determining health care utilization were also examined. Additionally, psychosocial adjustment and the overall reported symptoms of the VA user versus the non-VA-user were examined in order to determine why veterans may avoid VA health care facilities.

## Significance

The significance of this work in its entirety lies in its potential to inform health care professionals of latent health problems that could be present in Vietnam veteran clients. Health professionals need to be aware that exploring the war's role in the life of a Vietnam veteran may be pertinent in determining his health needs.

Regardless of whether a conclusive epidemiological link can be established between Agent Orange exposure and chronic illness, the Vietnam veteran's physiological health needs could be affected by his belief that he was harmed by the exposure. Similarly, this is true of the veteran's psychological health. If the veteran believes that his mental health deteriorated after the war, then his psychological problems would be just as real as if he had been given a psychiatric illness label.

This research was intended to provide information to private health care providers about potential patterns of illness and symptomatology in Vietnam veterans. It is hoped that this information will help to eliminate the attitude prevalent in the private sector that the VA alone is responsible for veterans' health care. If primary care providers at the community level were to develop more knowledge about the Vietnam War and more compassion for its veterans, they would be better equipped to meet the veteran's health needs.

## Limitations

Findings are not to be generalized to the entire Vietnam

veteran population because of the absence of a control group, the small size of the sample, and the lack of a random sampling technique. However, information about symptom trends may be useful at a community level.

Since the research was not intended to uncover clinical problems that required health care referral in the Vietnam veteran, no attempt was made to control for an individual's past medical history or his family medical history. Subsequently, it is not known if any given post-Vietnam symptom/illness is a result of pre-Vietnam medical factors. The actual type of symptom/illness reported is not considered to be as important as the change reported over three time periods--before, during, and after Vietnam. The author does not presume to draw any conclusions about the war's role as a potential precipitating factor of an individual's self-perceived during-Vietnam and after-Vietnam health state. However, the degree to which a Vietnam veteran perceives the war as a pivotal point in his health state was addressed. Given the utility of a self-report symptom survey that demands a recall of a period of ten years or more can be limited by the perimeter of an individual's memory, trends of increasing reported symptoms may be useful in predicting an individual's health care needs. Also, the presence of a self-perceived trend of increasing symptoms from the before-Vietnam to the after-Vietnam period in a Vietnam veteran client can indicate to a health care provider the need to explore an individual's attitude toward his war experience.

Potential Agent Orange exposure symptoms in Vietnam veterans

were not examined with the intent of drawing a cause-and-effect relationship between military station in Vietnam and number of reported symptoms. It may be many years before all the facts have been uncovered about the Agent Orange issue. In the interim, work such as this may assist health care providers by providing information on the perceived risk of Agent Orange exposure that a Vietnam veteran may feel.

The types of symptoms classified as potential Agent Orange exposure symptoms are nonspecific and not confined to one system of the body. However, until a final conclusion has been reached about the potential that Agent Orange possesses for causing chronic health problems, research of this kind may illustrate to health care providers the need to explore with an open mind unusual patterns of reported symptoms that appear in a Vietnam veteran client.

The health care utilization section was intended to suggest particular factors that may need to be considered at the community level before the health needs of the Vietnam veteran can be adequately addressed. No specific recommendations as to which services are needed were made, but rather, information was provided about existent patterns of use as they relate to the overall health state of the Vietnam veteran. In this way, the investigation can serve to encourage health facility planners to collaborate with private health care providers in the community in the provision of services sensitive to the needs of Vietnam veterans.

# CHAPTER II

# REVIEW OF LITERATURE

## Introduction

Interest in the postwar health of veterans is predominantly a twentieth-century phenomenon. The underlying premise of the majority of the early research was that certain individuals were prone to psychological health problems in response to the stress of war. By the 1960s, the concept of psychological health had expanded to include how a person related to his environment. Psychologists did not always agree on whether psychological health dictated response to the environment, or if the reverse was the case. Some professionals suggested that a person's method of interacting with his environment might constitute another aspect of his total health--the psychosocial aspect of health.

The bulk of the literature on the status of veterans' health dealt with the combined psychological and psychosocial effects of the war on the individual. There seemed to be little scientific interest in the physiological aftermath on veterans' health. This was probably attributable to the belief that physiological injury was inevitable in a war. After World War II, researchers began to link certain physiological responses to psychological stress. Subsequently, the postwar physiological health of veterans received

more attention.

The Federal Government had been addressing the physiological, psychological, and psychosocial health needs of veterans since 1930 (Kuramoto, 1980), predominantly through the VA. Although first priority was given to veterans with service-connected disabilities, veterans with nonservice-connected problems were treated if they were over 65 years of age or indigent and were in need of hospitalization (National Research Council, 1977). In the late 1970s, the VA was suddenly faced with a new population of veterans who were seeking health care for symptoms of dysfunction rather than documented illnesses or injuries. Some veterans alleged that their symptoms were due to Agent Orange exposure; others attributed their symptoms to delayed stress syndrome. Still others had no idea what was wrong with them. Furthermore, all of them believed that the Vietnam War had something to do with present symptomotology and/or illness, physiological and psychological.

## Psychological Aspect of Health

Historically, the effects of war on a soldier's mind have taken many names: traumatic neurosis, battle fatigue, combat exhaustion, shellshock, acute combat reaction, to name a few. As a result of a physician's subjective judgment, these labels have been applied on the basis of one or a combination of these symptoms:

> . . .loss of appetite, irritability, jumpiness, disturbed sleep, gross conversion reactions of various types (e.g., paralyses, blindness, aphonia), disorientation, complete disorganization, confusion, panic, apathy, choreiform movements, tics, stammering, syncopal attacks, delirium, stupor (Kormos, 1978, p. 4).

The difficulty in assessing the presence of psychological illness or the presence of symptomatology in an individual is that often the individual is unable to ascertain any differences in his own mental function or behavior. Therefore, the responsibility for the diagnosis of psychological illness and/or symptomatology lies solely with friends, family, or physician. Also, many symptoms of psychological illness may be symptoms of physiological illness as well, especially if taken out of the behavioral context (such as loss of appetite).

Prior to World War I, shellshock was believed to have a physiological basis. It was believed that exploding shells caused multiple petechial hemorrhages in the cerebrum, which in turn, caused emotional breakdown (Bourne, 1970). After World War I, the theoretical pendulum swung in the opposite direction. It was then believed that certain individuals were predisposed to develop traumatic neuroses on the battlefield because of longstanding character defects. This belief was an outgrowth of Freud's psychoanalytic theory, which was popular at that time. These psychological reactions were then subsumed under the rubric of "Transient Situational Personality Disorders" with the proviso that symptoms should recede as the stress diminished (Boulanger, 1981).

One of the first researchers to examine the concept of stress was Selye (1976). Selye defined stress as an organism's specific somatic response to damage or threat of damage by a wide variety of environmental agents, including events that had a psychological rather than a physiological impact. In 1936, Selye observed

hormonal fluctuations in the adrenal medulla and, what he termed, the pituitary-adrenal axis, in response to psychic and physical stress. The results of his work were a rash of studies on stress in both experimental and naturally occurring situations. However, despite the confirmation that the adrenal secretions of hormones did change in response to stress, some researchers (Fox, Murawski, Bartholomay & Gifford, 1961; Wolff, Friedman, Hofer & Mason, 1964) discovered that a more significant predictor of the body's physiological responses to stress was the individual's style of coping with stress.

Since there was considerable professional disagreement as to what precipitated what, it did not seem unusual that a team of researchers (Horowitz & Solomon, 1978) would suggest that stress disorders were a response to physiological changes in the body. Regardless of whether stress was a cause or an effect in the body, the fact remained that, by the late 1970s, stress was an accepted entity.

Probably, because war was so universally considered stressful, a number of researchers sought to explore the long-term effects of combat stress in World War II veterans. Brill and Beebe (1955) found no psychological problems that differed from preservice variables in a group of 1,000 World War II veterans, except in subjects who had been classified as having either personality disorders or acting out characters. However, follow-up research conducted at a 20-year interval (Archibald & Tuddenham, 1965) and a 30-year interval (Klonoff, McDougall, Clark, Kramer & Horgan,

1976) showed a persistently high incidence of psychiatric difficulties, many of which had initially occurred as late as seven years after the war.

Despite this evidence that war might have lingering effects on a veteran's psychological health, the military felt it had a handle on battle-related psychological problems, by the Vietnam Era. Bourne (1970), who compared psychiatric casualty rates among veterans of Vietnam (12 per 1,000), Korea (37 per 1,000), and World War II (101 per 1,000), was convinced that this was evidence of the psychological health of the Vietnam veteran. He attributed this to the 12-month tour of duty in Vietnam, the frequent periods of rest and recuperation, and pharmacological advances in the mental health field. Other experts (Lifton, 1973; Starr, 1973) also added the widespread availability of illicit drugs to this list.

Some researchers (Braatz et al., 1971; Figley 1978b; Solomon, Zarcone, Yoerg, Scott & Maurer, 1971) argued that these statistics had been artifically lowered by the large number of administrative discharges that were granted by the Army to rid itself of veterans with discipline problems. The discharges fell into two categories: General and Undesirable (Discharge Under Other-Than-Honorable Conditions). The former classification included personality disorders, listed as the leading cause of Army administrative discharges, which were greater than for any other branch of the service. The Undesirable category included such infractions as discreditable involvement with civil or military authorities, established patterns

of shirking, and drug abuse--all of which could have signified a psychologically impaired individual (Bitzer, 1980). The final irony of the Undesirable-discharged veteran's situation was that he lost his entitlement to VA benefits, despite the possibility that his actions were a cry for psychological help.

So the question remained: What was the psychological health state of the returning Vietnam veteran? Bourne (1970) had researched American and Vietnamese psychiatric casualties in 1966. He found less psychosis and neurosis among the American soldiers, but a greater incidence of depressive disorders, that the American tended to verbalize.

In the early 1970s, a few professionals (Lifton, 1973; Shatan, 1978) were writing about psychological symptoms that they were seeing in clinical contact with Vietnam veterans. These symptoms included the following:

1. Re-experiencing involvement in Vietnam. This usually occurred through recurring nightmares but it could be triggered by an environmental or ideational stimulus. An example of the latter occurred in a group of Vietnam veterans who were camped near a Marine base. Low-flying military planes were overhead. Without a word to each other, they all hit the dirt (Kinman, 1981).
2. Numbed responsiveness to the environment. This was often indicated by veteran disinterest in activi-

ties he had previously enjoyed and by withdrawal from friends and family.

3. Exaggerated startle response.

4. Sleep disturbance.

5. Guilt about surviving.

6. Memory impairment or trouble concentrating.

These symptoms were grouped together under the various labels of delayed stress syndrome and post-Vietnam syndrome. The news media picked up the term and started to apply it to any Vietnam veteran who committed a crime. If a sniper went on a rampage in a city in the United States, the media was often quick to record the fact that he was a Vietnam veteran.

By the mid-1970s, pressure had been brought to bear against the American Psychiatric Association to recognize delayed stress as a legitimate psychiatric response to a catastrophic occurrence. Based on the recommendations of a committee of experts in 1975, the American Psychiatric Association (APA) officially recognized the new category of posttraumatic stress disorder, acute and chronic (Appendix B) in 1979 (American Psychiatric Association, 1980).

Irrespective of the APA's pronouncement, a number of authorities including VA officials were not convinced. Wilson (1980) insisted that the incidence of stress-related disorders had more to do with the circumstances of the homecoming than of the war. He cited some. First, there was a widespread mistrust among Vietnam veterans of the government in general and the Veterans Administra-

tion specifically. Second, many veterans felt exploited, rejected, and stigmatized for their military service in Vietnam. Third, the diminished provisions of the GI Bill made it difficult for veterans to obtain higher education and job training, resulting in a disproportionately high rate of unemployment among Vietnam veterans. Fourth, as discovered by Horowitz and Solomon (1978), most veterans rarely, if ever, discussed their war experiences with others. Thus, it appeared to some that psychosocial adjustment factors were significant in determining a Vietnam veteran's psychological health.

## Psychosocial Aspects of Health

Figley (1978b) divided the psychosocial adjustment literature into two categories that reflect opposing viewpoints. The first is the "stress evaporation perspective," which holds that combat was a stressful event that may have caused temporary emotional distress; however, most symptoms of psychological maladjustment disappeared shortly after resumption of civilian life. The second is the "residual stress perspective," which holds that the onset of stress symptoms is delayed after returning from the war but can persist for years. Figley and Southerly (1980) explored the issue of the postmilitary adjustment of the Vietnam veteran. The veteran's overall adjustment was based on a number of variables: demographic information that included marital status and education, service data, employment history, emotional attitudes toward his life at present coupled with his feelings toward his military service, and his present level of drug use. The researchers concluded that the

majority of veterans adjusted very well to military service and made a successful transition back to civilian life. However, there were a number of combat veterans who were still experiencing nightmares about military service.

Many other researchers sought to explore the psychosocial adjustment of Vietnam veterans. Their definitions ranged from broad [a state of general emotional well-being, satisfaction, and comfort with other people as well as oneself (Figley, 1978b)], to narrow [self-concept (Carr, 1973)], and every gradation in between [unemployment, trouble with the law, substance abuse, etc. (Worthington, 1973; Borus, 1973)].

From 1970 to 1978, researchers struggled with various methods of studying the Vietnam veteran. Some investigators chose to compare samples of veterans with nonveterans, often in a collegiate setting. Other researchers compared Vietnam veterans to peers who were Vietnam Era veterans, either while both were still in the service or after discharge. The VA hospitals provided Vietnam veteran subjects for certain research. A number of researchers (DeFazio, Rustin & Diamond, 1975; Lumry, Cedarleaf, Wright & Braatz, 1970) chose simply to describe the psychosocial adjustment characteristics of a sample of Vietnam veterans, irrespective of comparison with other groups. Most investigators assumed that service in Vietnam per se produced some degree of measurable change in an individual's life. Additionally, some researchers (Strayer & Ellenhorn, 1975; Nace, Meyers, O'Brien, Ream & Mintz, 1977) suspected that a combat position might have caused more dramatic changes

in an individual's life than a noncombat position.

In a large-scale study of American youth, Yankelovich (1974) discovered that he had 176 Vietnam veterans in his sample of 2,516. He observed that this group had a higher unemployment rate and was more discouraged about the future than the others. Carr (1973) and Enzie, Sawyer, and Montgomery (1973) surveyed Vietnam veteran and nonveteran groups in a college undergraduate population in relation to self-concept and manifest anxiety, respectively. No significant differences were found between groups. This could have been attributable to the possibility that the veterans pursuing higher education represented the best adjusted segment of the Vietnam veteran population.

Other researchers utilized collegiate Vietnam veteran samples without control groups. Defazio et al. (1975) discovered that, five years postdischarge, one to two-thirds of their sample were suffering from frequent nightmares, difficulty in relaxing, trouble getting close to others, nervousness, ready fatigue, and short-temperedness. Combat veterans demonstrated twice the number of symptoms of noncombat veterans. Having obtained similar results in his own study, Figley (1978a) was prompted to question: Given the extent of the symptoms present in the nominally well-adjusted higher-educated Vietnam veteran, what symptoms could be expected in the less-motivated, less-intelligent veteran?

One of the limitations of the college-based studies was the self-selection method of sampling. Often, students answered advertisements. Since many Vietnam veterans were reputed to feel

estranged from society, it could be argued that those who would volunteer represented the extremes of the spectrum, either the very well-adjusted or the very poorly-adjusted.

Borus (1973) evaluated psychosocial readjustment on the basis of two issues: instances of punishment for military infractions and number of visits to a military mental health facility. The sample was composed of 577 newly-returned Vietnam veterans and 172 veterans who had served at that particular domestic Army base during the war. Borus observed that 23% of the Vietnam veterans had some degree of maladjustment in the first seven months after return. However, there was no statistical difference between the two groups. The researcher acknowledged that the trigger to the onset of severe adjustment problems could be the return to civilian life.

Panzarella, Mantell, and Bridenbaugh (1978) also utilized men who were still on active duty. The sample consisted of Vietnam and Vietnam Era veterans who sought help at a military mental health facility. No significant differences were found between the groups for signs and symptoms of physiological and psychological stress. Panzarella et al. (1978) did not consider combat to be a variable. They believed that, on the basis of their interviews, whether a soldier was in a combat role or a support role made no reliable difference in his exposure to fear and violence in a war with no battlelines. This theory was supported by Strayer and Ellenhorn (1975). Although the researchers found that combat was associated with a negative attitude toward the war, guilt, depression, and hostile feelings; they contended that the veteran's perception of the

extent and intensity of his combat involvement was closely related to his degree of civilian adjustment.

In reviewing work done with subjects on active duty, one must be mindful that many Vietnam veterans were reluctant to volunteer information to "official sources" (Horowitz & Solomon, 1978). Added to this observation, was Figley's (1978b) allegation that a veteran would rarely, if ever, make a response that could potentially impede his discharge from the military. The latter statement may have partially explained the results of research of the psychological characteristics of Vietnam veteran psychiatric inpatients at VA hospitals (Stuen & Solberg, 1972). These veterans were compared with a control group of active-duty volunteers who had never been hospitalized for psychiatric reasons. The researchers found that the hospitalized group had fewer coping abilities, histories of stressful parental relations, and a higher incidence of drug and alcohol use. The findings would have been enhanced by using a veteran control group.

Buchbinder and Schranger (1979) used VA psychiatric inpatients to investigate the concept of post-Vietnam syndrome. The sample consisted of 47 Vietnam veterans, 53 Vietnam Era veterans, 51 combat veterans from other wars, and 61 pre-Vietnam veterans who saw no combat. Despite the researchers' apparent interest in the combat issue in the sample selection, they did not control for combat in their methodology. Vietnam veterans scored higher than controls in self-perceived capacity for violence, excessive rumination about service experiences, guilt and sleep disturbances. In

spite of these findings, the researchers concluded that there was little evidence for a post-Vietnam syndrome among veterans.

The overall Vietnam veteran inpatient population at VA hospitals served as the basis for other work. A survey of hospitalized Vietnam veterans (Lumry et al., 1970) found that 6% of the sample had family relationship problems and interpersonal adjustment difficulties, the latter characterized by inability to maintain satisfying personal relationships. This figure would seem to represent a very small degree of adjustment difficulties, perhaps an even smaller percentage of maladjustment than is present in the entire veteran inpatient population.

Worthington (1973) sampled a group of returned Army veterans in Salt Lake City, Utah to determine the factors most important in determining preservice adjustment, as measured by the concept of anomie. Anomie was defined as feelings of confusion, anxiety, frustration, helplessness, and social isolation. The researcher found that service in Vietnam had comparatively little effect on postservice adjustment. Certain demographic variables were more reliable predictors of post-service adjustment. Poor adjustment correlated with unemployment, dropping out of high school, and no religious affiliation. Some authorities (Egendorf et al., 1981; Starr, 1973) alleged that this was true because these adjustment variables were more prominent in the Vietnam veteran than the Vietnam Era veteran.

A few researchers, such as Defazio et al. (1975), conducted studies on groups of veterans at intervals following military

discharge. A random sample of Vietnam returnees 10 months post-discharge (Helzer, Robins & Davis, 1976) showed a 56% incidence of a depressive syndrome. The latter was defined as:

> A depressed mood for a period of four weeks plus three or more of the following: insomnia, anorexia, lethargy, worry about insanity, crying spells, and suicidal thoughts (Helzer et al., 1976, p. 179).

Similarly, another team of researchers (Nace et al., 1977) utilized the Beck Depression Inventory to examine a group of 202 Vietnam veterans two years after discharge. Thirty-five percent tested in the clinically depressed range. These veterans were more likely to have been in combat. However, the determination of combat was based only on the veteran's subjective appraisal of his role as combat or support. Additionally, the findings would have been strengthened if the researchers had cited figures related to clinical depression in a sample of the general population.

The researchers compared the depressed and the nondepressed groups on a number of psychosocial variables. The depressed veteran was more likely to be unmarried. He used a wider range of drugs while in the service, and was involved in more disciplinary actions with the military while in Vietnam. He also was slightly less educated.

The study that served to tie together the previous psychological and psychosocial research on the Vietnam veteran was released in March, 1981 (Egendorf et al., 1981). It was a product of eight years of research that received its inspiration from a meeting of Vietnam Era veteran self-help groups in 1973. The initial

financial support came from private foundations. In 1976, the National Institute of Mental Health awarded a grant to the investigators, and in 1978, the VA added its support in order to comply with a Congressional mandate that ordered an independent study of veteran readjustment.

Data were obtained from three to five hour interviews with 1,380 men from every region of the country. The sample was comprised of 50% nonveterans and 50% veterans. The latter group was subdivided into half Vietnam veterans, half Vietnam Era veterans.

Some of the key findings were the associations made between psychosocial adjustment variables and long-term stress. Combat was also a key variable. For example, overall, Vietnam Era veterans had less social and psychological problems than combat veterans. When social background factors were controlled, combat was strongly associated wtih self-perceived drug and alcohol problems, psychological symptoms of stress, medical problems, and trouble with the law--both during and after Vietnam. The researchers believed that they demonstrated more associations with combat because of the detail with which they defined it.

Seeking to determine the validity of the delayed stress theory, the researchers found that 33% of White heavy combat veterans were suffering from stress effects. The stress scale utilized corresponded with the APA's criteria for the diagnosis of posttraumatic stress disorder [Appendix B, the material of which has been reprinted with written permission of the APA (American Psychiatric Association. Diagnostic and Statistical Manual (3rd ed.). Washington, D.C.:

American Psychiatric Association, 1980)]. The stress pattern was more prominent in veterans who had left Vietnam six to ten years previously than in those who had left 11 to 15 years prior. This finding would corroborate the contention of some authorities (Wilson, 1980; Figley & Leventman, 1980) that the entire aspect of the war changed after 1968, politically and militarily. The year 1968 was when the lack of consensus on the war's objectives manifested itself among the American people.

In combat-exposed Vietnam veterans, higher levels of stress were associated with lower educational attainment, lower income, and irregular or unsatisfying employment. Interestingly, stress symptoms were found to decrease with combat exposure in those veterans who came from small cities (population 100,000 to 500,000). The researchers theorized that this was because the small-city Vietnam veteran received more of a hero's welcome-home than his big-city comrades, and yet was able to associate with other Vietnam veterans after his homecoming, as his rural peers could not.

The authors concluded that adjustment was facilitated by support from a wife and/or friends who were also Vietnam veterans. Although the poorly adjusted veteran was in the minority, there was a range of adjustment. The veteran who "worked through" his Vietnam experiences was better adjusted than his peer who tried to put the war behind him or one who viewed the war as a horrible experience never to be repeated.

## Physiological Aspect of Health

The medical problems of the Vietnam veteran were divided into

three categories by Egendorf et al. (1981): physiological deficits which had no psychological basis, physiological deficits which could potentially be caused by emotional problems, and physiological deficits which could potentially be caused by either physiological or emotional problems. Therein lay the crux of the difficulty in assessing the Vietnam veteran's physiological health state.

The scientific community generally believed, unless a veteran sustained an actual combat wound, that any physiological symptoms that he manifested after the war originated from psychological stress. This notion was corroborated by the longitudinal study of prisoners of war (POWs) begun in 1973 (Hunter, 1980). The literature had long recognized the psychological stress reactions that could result from wartime imprisonment by the enemy. By demonstrating its interest in examining the total health effects of the imprisonment experience, the Center for Prisoner of War Studies gave credence to the thesis that physiological symptomatology and/or illness often accompanied psychological stress reactions.

Physiological symptomatology, which can be defined as a change in an individual's bodily function that can only be perceived by the individual himself, was elicited from subjects through the standard health history. In addition, psychological symptomatology was ascertained through interviews and psychological tests. Physiological illness, which can be defined as any disease that is a product of a functional change in an individual's body systems that has been diagnosed by a physician, was determined by a physical examination, a battery of blood tests, special X-rays, lung function

tests, and stress tests for the heart. Each year, the entire procedure was repeated. Preliminary findings of the first two-year period suggested that there was a trend toward increasing number of new physiological symptoms (Spaulding, 1975).

Many researchers questioned if the circumstances of combat alone could produce stress comparable to that of POW confinement in an individual, and thus result in physiological symptomatology and/or illness. Egendorf et al. (1981) found that, as a veteran's degree of combat exposure increased, so also did his medical problems during and up to one year after Vietnam. However, this conclusion was based on subjective responses to a question that inquired about "major medical problems" in or after the service.

When the first reports of symptoms of potential Agent Orange exposure surfaced after the March 1978 CBS documentary, some members of the scientific community (Hearing before the Subcommittee, 1978) believed that the veteran claimants most likely were opportunistic individuals who had read about dioxin's effects on humans. Other widely-held opinions were that physiological symptoms of potential Agent Orange exposure had a psychological origin, and the psychological symptoms of potential Agent Orange exposure were really symptoms of depression and/or posttraumatic stress disorder (Young, Calcagni, Thalken & Tremblay, 1978).

Veteran advocacy groups quickly became involved in the search for the truth about Agent Orange. One group, known as Agent Orange Victims International (AOVI), was organized by Vietnam veteran Reutershan, before he died of stomach cancer that he attributed to

exposure to Agent Orange. AOVI compiled all the available international literature on the effects of dioxin that supported its belief that Agent Orange exposure was harmful. The organization also backed a class action suit, filed on behalf of all Vietnam veterans, in January 1979, that sought to sue herbicide manufacturers for damages sustained by veterans exposed to Agent Orange (Associated Press, 1980).

Citizen Soldier, another veteran advocacy organization, surveyed 1,200 Vietnam veterans for potential symptoms of Agent Orange exposure (Stellman, S., 1980). The major methodological limitation was the lack of a control group. Since authorities had not been able to agree on how Agent Orange exposure should be determined, researchers who were seeking information on the prevalence of potential Agent Orange exposure symptoms in the Vietnam veteran population at large were often faced with a self-selected sample, who volunteered <u>because</u> of the symptoms they were experiencing.

With the limitations of self-selection in mind, Stellman avoided definitive statements about the symptoms reported. He made only rough associations between variables. For example, any veteran who reported exposure, regardless of the alleged route, was designated with an exposure marker. Quantitative associations were then made between certain symptoms reported by that veteran. Stellman stated that veterans who reported skin conditions <u>could be</u> 30% to 80% more likely to father children with birth defects. The sheer tentativeness of this conclusion indicated the collective reluctance of Agent Orange researchers to draw cause-and-effect relationships.

The most promising investigation to determine the long-term effects of Agent Orange exposure is being conducted by the Air Force on the men who participated in the Operation Ranch Hand spraying missions. The work is expected to take six years to complete (Bernstein, 1980). Since the airmen involved in Operation Ranch Hand were often drenched in herbicides while handling them, many authorities believe that, if this research fails to turn up significant veteran symptomatology and/or illness, the DOD will feel free to close the door on the Agent Orange issue.

Faced with the outcry of a vocal segment of the Vietnam veteran population, Congress acted to instruct various federal agencies (Health and Human Services, Labor, Defense, Agriculture, VA, Environmental Protection Agency, and Office of Science and Technology Policy) to conduct independent research of the long-term health effects of phenoxy herbicides and contaminants. An Interagency Working Group was established to coordinate the efforts and goals of the different departments (Bernstein, 1980). Regardless of the outcomes, at the very least, the public consciousness will have been raised on Vietnam veterans' health care issues.

## Health Care Needs and Utilization Patterns

### Needs

When the Vietnam veteran began returning to the States, the VA expressed doubts that the returnees would fit in at the VA hospitals, which catered primarily to the needs of a chronically ill,

frequently alcoholic, elderly population (Starr, 1973). Subsequently, the VA conducted administrative seminars in 1971 to inform its personnel of the needs of the Vietnam Era veteran population (Vietnam Era Veteran, 1971). Although some attention was directed to the veteran's potential physical disabilities, the major focus of the seminars was his psychosocial characteristics. The VA hierarchy viewed the Vietnam Era veteran as a typical representative of the rebellious youth culture of the 1960s. He was said to have an assertive response to and disregard for authority, an intense identification with his peers, and a tendency toward diminished control over feelings and impulses. The VA encouraged its staff to be tolerant of these alleged characteristics in the Vietnam Era veteran population.

Unfortunately, seminars could not change the opinions that many people held about returning Vietnam veterans--that they were "junkies." Musser and Stenger (1972) cited DOD statistics that indicated that less than 1% of Vietnam Era veterans were heroin addicts. The researchers then profiled the demographic characteristics of the veteran drug abuser. Sixty percent were Black, 90% had a high school education or less. Thirty percent admitted to drug use prior to Vietnam.

Of the Vietnam veterans treated at VA Hospitals from 1968 to 1971, slightly more than half had been using narcotics, predominantly heroin. The remaining half had used other drugs, predominantly barbiturates, hallucinogens, and marijuana (Musser & Stenger, 1972).

The VA had 202 outpatient clinics that provided the initial treatment of substance abuse problems. Once the individual's treatment program was underway, it could be continued in day treatment centers. Treatment dropout rate was 20% (Musser & Stenger, 1972). In a survey of heroin users three years postdischarge, Stanton (1980) found that 90% of those addicted in Vietnam were drug-free. Some authorities believed that the VA's substance abuse program was one of the most pertinent to the needs of the Vietnam veteran.

The VA did not initially provide any special psychological services for the Vietnam veteran. A number of researchers (Defazio et al., 1975; Nace et al., 1977) found that, of a group of Vietnam veterans who demonstrated symptoms of depression or other psychological stress, few individuals had ever sought treatment for their symptoms. The Schottland Report (1973) evaluated the VA's mental health programs. A number of recommendations were made for improvement: increased collaboration between the VA and community providers, extension of benefits to veterans with nonservice-connected disabilities, and provision of special services for Vietnam veterans.

The first VA facilities to address the unique needs of the Vietnam Era veteran were established by Congressional mandate on October 1, 1979 (Veterans' Readjustment Act, 1979). Nicknamed "Operation Outreach," by the VA, Outreach work sites, referred to as Vet Centers, were to be community-based centers, established outside existing VA facilities, and staffed with Vietnam Era veterans when possible. During the first year of the program's

existence, 91 Vet Centers were developed. The major goal of the program was to provide readjustment counseling, not medical treatment. Each Vet Center was given three functions: outreach, direct service delivery, and referral. The outreach function involved taking any action necessary within the community to reach and engage Vietnam Era veterans. Vet Center services were generally based on the talents of the staff but included individual counseling, group counseling (rap groups), and family counseling. The Vet Center staff was permitted to make referrals to the most appropriate resource in the community. In this way, the Vet Center developed a rapport with the community service programs as well as with the VA medical treatment program.

In the wake of federal budget-cutting fervor, Operation Outreach was targeted to lose its funding in fiscal year 1982. However, passage of the Veteran's Health Care Act of 1981 renewed the program's funding for another three years (Report to the Full House, 1981). It should be noted that the Senate and the House of Representatives of the 97th Contress passed slightly differing versions of this bill in June 1981. At this writing, the final wording of the bill is scheduled for debate in the September 1981 Congressional agenda.

As the 1970s drew to a close, the "Achilles heel" of the VA continued to be the Agent Orange issue. In testimony before the Subcommittee on Oversight and Investigation of the House Interstate and Foreign Commerce Committee in February 1980, then VA Administrator, Max Cleland, assured Congressmen that, "no eligible

veteran who is concerned about Agent Orange will be denied Veterans Administration medical care" (Cleland, 1980, p. 1). The administrator sought to back up his statement a few weeks later by phoning random VA hospitals around the country. He posed as a Vietnam veteran in search of information on Agent Orange. He was unable to find anyone knowledgeable and/or willing to discuss his problem (Bonior, 1980). This occurred a full one and one-half years after the first memorandum about Agent Orange was sent to all VA hospitals from the VA Central Office. As a result of the phone calls, an irate VA Administrator issued an order to the hospitals "to clean up their acts" on the issue of Agent Orange.

Today the VA is reportedly collecting the data from the medical examinations and histories of all Vietnam veterans who have claimed exposure to Agent Orange. In addition, a registry is being maintained of tissue samples for analysis of the potential long-term effects of Agent Orange exposure (Carr & McNally, 1980). The VA is also conducting a large-scale epidemiological study of Vietnam veterans' health as it relates to potential Agent Orange exposure. The scope of this work will be expanded by the Veterans' Health Care Act of 1981 (Report to the Full House, 1981), if the law that is finally enacted reflects the provisions of the House bill that was passed (H.R. 3499).

## Utilization Patterns

The VA has been addressing veterans' health needs for 50 years, in 165 hospitals across the country (Starr, 1973). In the

National Survey of Veterans, Hammond (1980) estimated that only 40% of all veterans were eligible for VA treatment. Eligibility for health care is arranged according to the following priorities (Egendorf et al., 1981):

1. Service-connected disabled veteran.

2. Veteran unable to defray the cost of his medical care elsewhere.

3. Veteran 65 years of age or older and veterans on VA pension.

4. Veteran with nonservice-connected disability who requires hospitalization.

It should be noted that a veteran who has a nonservice-connected disability that requires outpatient treatment is ineligible for care. This category includes the vast majority of veteran claimants of potential Agent Orange exposure, as most have a conglomeration of symptoms that have not been diagnosed as an illness.

Many researchers (National Research Council, 1972; Egendorf et al., 1981; Bitzer, 1980) have documented the reluctance of Vietnam veterans to utilize VA health care facilities. Hammond (1980) concluded that Vietnam veterans with physical problems (37%) were most likely to use the VA. Interestingly, despite the alleged effectiveness of the substance abuse program at the VA, only a fraction of Vietnam veterans with substance abuse problems (8%) have used VA services.

Researchers have cited different reasons for the poor use of VA health care facilities. Hammond (1980) found that veterans used

non-VA facilities because they had adequate hospitalization benefits (42.4%), lived too far from a VA facility (19%), or were not entitled to VA care (14.1%). Lifton (1973) cited angry feelings toward the military and the government as the main reason that Vietnam veterans avoided use of the VA. Also, Vietnam veterans who had an array of symptoms that did not culminate in a diagnosis often turned away from the VA in frustration (Neff, 1975).

## Summary

The review of the literature supports the need for identifying the physiological and psychological symptomatology and illnesses present in the Vietnam veteran who is not seeking health care from the VA. Commmunity planners and private health care providers cannot furnish appropriate health services for the Vietnam veteran without knowledge of his state of health. Since his degree of psychosocial adjustment would likely affect his level of utilization of services, if not actually dictate some of his health needs, knowledge of the Vietnam veteran's psychosocial adjustment characteristics would also be important for the community to have.

## Conceptual Framework

For the purposes of this study, the schematic (Figure 1) represents the researcher's conceptualization of health and its relationship to health care utilization. The terms in Figure 1 are adapted from those of Aday and Andersen (1975) in the development of a conceptual framework to analyze the study of access to health care.

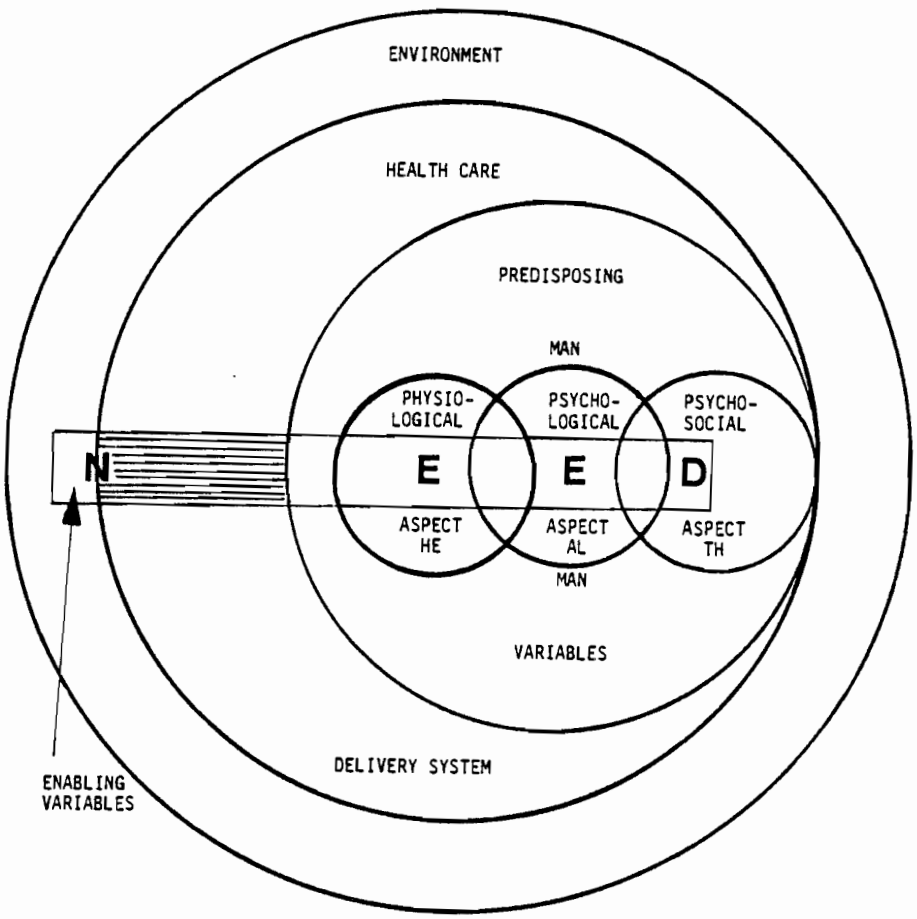


Figure 1

Physiological, Psychological, and Psychosocial Aspects of Health: Interaction with the Environment in the Determination of Health Needs

The center of the schematic is the individual existing in continuous communion with his environment. At the core of his being is health. The physiological aspect of health encompasses daily biological needs for life, age, and the body's continuous processing of symptoms that may signify dysfunction in an organ system, that in turn would require compensatory modifications in another organ system.

The psychosocial aspect of health deals with the ability to process daily contacts with a potentially noxious environment. This includes dealings with family, friends, and society in general. Processing is directed toward the preservation of the integrity of emotions and the reinforcement of feelings of self-worth. The emotions with which he has to deal in achieving this balance, such as anger and greed, are contained in the intersection of the psychosocial and psychological health aspects (Figure 1).

Psychological health is the bridge that connects the physiological and psychosocial aspects of health. It is difficult to define in a denotative manner. The concept of psychological health is more simply expressed as the absence of clearly identifiable symptoms of psychological (mental) illness. The center of psychological health aspect's circle (Figure 1) can be conceptualized as an area where a sense of personal well-being predominates over other intellectual functions. This sense is a filter for unpleasant experiences and emotions that threaten to disrupt the overall sense of self. The intersection between the psychological and physiological health aspects can be conceived as an area in which the

existence of physical ill health is signified by psychological symptoms and vice versa.

The horizontal sphere in the center is need for health care; it can be seen to intersect with all three aspects of an individual's health. This can be simply interpreted by stating that health care needs are dictated by the aspects of health in one of five ways: by physiological health factors alone, by physiological factors in combination with psychological factors, by psychological health factors, by psychological and psychosocial health factors in combination, or by psychosocial health factors alone.

If the health state of the individual was the only factor important in determining his health needs, the results of health surveys could immediately be converted to actual health services. However, other variables have been shown to be as important, if not more so, than health state in the determination of need for health care.

The area in the individual's circle (Figure 1) surrounding the core of health is composed of what Aday and Andersen (1975) term predisposing variables. These are such attributes as sex, race, religion--all of which affect the individual's unique assessment of health care. In the case of the Vietnam veteran, these would include his attitude toward the VA, toward his war experience, and his knowledge and beliefs about Agent Orange.

The health care delivery system can be described as the arrangements for the rendering of care to consumers. In Figure 1, it is seen as a band of interface between the environment and the

individual.

The environment contains yet another set of variables that influence health need determination. These are enabling variables and consist of pertinent variables in the environment, such as region of the country, rural versus urban community, levels of community environmental hazards, and so on. Enabling variables pertinent to the Vietnam veteran would include availability of veteran support groups, proximity of the VA to the veteran, and VA classification of his eligibility for services. Enabling variables are represented in Figure 1 as the outermost part of the health need circle that intersects with the environment.

The shaded area signifies where level of use of health facilities equals need. This research of the health problems of Vietnam veterans seeks to explore the predisposing and health aspect components of health need as determined by a self-report method. The enabling variables could not be covered totally within the scope of this study.

## Research Questions

The research questions were organized along the following four lines:

1. Those that address overall patterns of symptoms/illnesses;
    a. What types of physiological and psychological illnesses and symptomatology are reported by the Vietnam veteran?

b. How do these reported illnesses and symptomatology occur during the time periods before, during, and after Vietnam?

2. Those that address patterns of symptoms/illnesses associated with potential Agent Orange exposure;

a. Of the total symptomatology/illnesses reported after Vietnam, how many symptoms/illnesses are associated with potential Agent Orange exposure?

b. How do the reported potential Agent Orange exposure symptoms/illnesses categorize into physiological and psychological components in relation to the three time periods?

3. Those that address patterns of health care utilization and factors that may affect those patterns, and

a. What patterns of health care utilization are reported by the Vietnam veteran?

b. What factors may be important in determining the veteran's pattern of health care use?

4. Those that address relationships between selected variables from the above three sections.

a. Is there a relationship between the total number of post-Vietnam symptoms/illnesses reported and exposure to combat?

b. Is there a relationship between the total number of post-Vietnam symptoms/illnesses reported

and the interval since the individual's last health care visit?

c. Is there a relationship between the total number of post-Vietnam symptoms/illnesses reported and self-rating of health?

d. Is there a relationship between the total number of post-Vietnam potential Agent Orange exposure symptoms/illnesses reported and the individual's knowledge and beliefs about Agent Orange?

e. Is there a relationship between the total number of post-Vietnam potential Agent Orange exposure symptoms/illnesses and the level of potential Agent Orange exposure of the individual's station(s) in Vietnam?

# CHAPTER III

# METHODS AND RESEARCH DESIGN

This chapter is divided into two sections. The first section details the original methodology employed by the researcher as well as the results of the pilot study. This is followed by a description of the difficulties encountered with the original methodology. The second section deals with the revised research design that was implemented.

## Original Sample and Criteria for Inclusion

This research was exploratory and descriptive in nature. The design was cross-sectional and utilized a questionnaire as the data collection tool.

The original target population was to have consisted of young (average age, 31.6), predominantly White male Vietnam Era veterans, who lived in the metropolitan areas of three Intermountain West cities of small (Cheyenne, Wyoming--metropolitan population, 50,000+); medium (Salt Lake City, Utah--metropolitan population, 500,000+); and large (Denver, Colorado--metropolitan population, 1,000,000+) size (Rand McNally Cosmopolitan World Atlas, 1969). The VA's Office of the Controller (1979) provided current figures on the

total numbers of Vietnam Era veterans in the designated metropolitan areas: Cheyenne, 14,000; Salt Lake City, 57,000; and Denver, 128,000. The VA did not separate Vietnam veterans from Vietnam Era veterans.

The sample was to have been composed of individuals who entered the Cheyenne, Salt Lake City, and Denver Outreach Vet Centers seeking assistance, from April 1, 1981 to May 31, 1981. These individuals were required to meet the criteria for inclusion and to agree to participate in the study. The goals of the Outreach Vet Centers were to provide vocational counseling and psychosocial adjustment assistance to Vietnam veterans. These centers were selected because they were not a part of the VA health care system. The researcher was interested in identifying health problems in a sample of ambulatory, nonacutely-ill Vietnam veterans.

The original criteria for inclusion consisted of the following:

1. The subject must be male.
2. The subject must have served one or more tours of duty in Vietnam or in its surrounding waters or countries (Cambodia, Laos, or Thailand) during the period from August 4, 1964 to March, 1973.
3. The subject must never before have served in a military (war-time) capacity.
4. The subject must have terminated his career military service after completing his Southeast Asian tour(s).

The last two criteria were designed to exclude military men from the sample. Subjects who had been involved in a war prior to

Vietnam could have demonstrated long-term stress effects from both wars. Subjects who did not terminate their military careers after Vietnam might still have been serving in the armed forces. As found in the literature, some researchers believed that the responses a serviceman gave while still on active duty would differ from those he gave as a civilian.

It was not originally desired to limit the study to Salt Lake City because of the possibility that the sample would over-represent certain variables. First, the State of Utah has one of the highest post-secondary levels of education in the nation. Second, the State of Utah is overwhelmingly White. Third, the Church of Jesus Christ of Latter-day Saints (LDS) is the predominant religion. The last factor might have been expected to influence the outcomes of psychosocial adjustment questions. Control for this possibility was anticipated by sampling from veteran populations in two other Intermountain West states.

## Instrument

### Body

The first section of the questionnaire (Appendix C) consisted of 233 items that solicited information about the veteran's physiological illnesses and symptomatology. Questions were arranged according to the following systems of the body:

1. Brain
2. Eyes and ears
3. Mouth, nose and throat

4. Skin
5. Musculoskeletal
6. Lungs and heart
7. Gastrointestinal (digestive)
8. Genitourinary
9. Sexuality.

Arranged randomly within each system were potential physiological symptoms of Agent Orange exposure (Table 2). All of the subject's positive responses to symptom questions in this section were classified by the subject as having occurred in one or more of three time periods--before, during and after Vietnam service. The subject was instructed that checking all time periods signified that he had first experienced the symptom/illness before Vietnam service, continued to have it during Vietnam service, and also experienced it after Vietnam service.

The next section concerned psychological health. Thirty-five items inquired about psychological symptoms, all of which were components of depression and/or posttraumatic stress disorder (Table 3). Psychological symptoms of potential Agent Orange exposure overlapped these categories (Table 4). The presence of psychological symptomatology was assumed for each "Yes" response and, the subject was asked to classify his symptoms as having occurred in one or more time periods: before, during, and after Vietnam service. The self-report method of obtaining information about the presence of psychological illness is considered unreliable, either because a subject is often not aware of his mental illness or because he is

Table 2

Physiological Symptoms of Potential Agent

Orange Exposure

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Brain

Do you have a constant numbness or tingling in any part of the body at least once a month?

Was any part of your body paralyzed?

Do you suffer from severe headaches at least once a month?

Does pressure or pain in the head make life miserable at least once a month?

Eyes and Ears

Is your eyesight ever blurry (apart from not wearing your glasses)?

Do your eyes pain you when you are in bright light?

Do your eyes continually blink or water?

Are your eyes red or inflammed at least once a month?

Are you hard of hearing?

Do you have pain in your ears at least once a month?

Do you have constant noises in your ears?

Mouth, Nose and Throat

Since you returned from Vietnam:

Have you noticed a decrease in your sense of taste?[a]

Have you noticed a decrease in your sense of smell?[a]

Table 2 Continued

| |
|---|
| Skin |
| Do cuts in your skin usually stay open a long time? |
| Do you get bruises the size of a quarter or larger at least once a month? |
| Do you often have an acne-like rash on your skin? |
| Since you returned from Vietnam: |
| Have you noticed that your skin is more sensitive to sunlight?[a] |
| Have you noticed any areas of darker color on your skin?[a] |
| Have you noticed an increase in the hair pattern on your body?[a] |
| Musculoskeletal |
| Do your legs give out on you at least once a month? |
| Do you get twitching in your muscles at least once a month? |
| Do you often have trouble keeping your balance when you walk? |
| Do you have pain in your joints at least once a month? |
| Lungs and Heart |
| Do cold hands or feet trouble you even in hot weather? |
| Gastrointestinal (Digestive) |
| Do you suffer from an upset stomach (indigestion, heartburn) at least once a week? |
| Do you usually feel bloated after eating? |
| Do you usually belch a lot after eating? |
| Other than when you are not feeling well, do you have a poor appetite at least once a week? |

Table 2 Continued

Gastrointestinal (Digestive) continued

Are you sick to your stomach to the point of vomiting at least once a week?

Do severe pains in your belly double you up at least once a week?

Do you suffer from loose bowel movements at least once a week?

Do you constantly suffer from bad constipation?

Have you ever had jaundice (yellow eyes and skin)?

Have you ever had serious liver disease (includes hepatitis)?

Genitourinary

Has your urine ever been coca-cola colored?

Sexuality

Did you have any children with birth defects after your return from Vietnam?

Have you been told by a doctor that you are sterile (unable to father a child) since your return from Vietnam?

Since you were in Vietnam:

Have you had trouble in trying to father a child?

Have you had difficulty enjoying a satisfactory sexual relationship?

Have you been bothered by a decrease in sex drive?

Have you often been troubled by the inability to have an erection?

Do you often have trouble maintaining an erection?

[a]These questions were derived from a synthesis of two questions that were worded "Have you noticed a change in_____," and "If yes, are they _____ or _____?" The response that indicated potential exposure was included in the synthesized questions above.

## Table 3

## Comparison of Depression and Posttraumatic Stress Disorder on the Basis of Psychological Symptoms

| Depression | Depression--Posttraumatic Stress Disorder | Posttraumatic Stress Disorder |
|---|---|---|
| Do you get spells of complete exhaustion or fatigue every couple of weeks? | Do you usually get up tired and exhausted in the morning? | Do you become scared at sudden movements or noises at night? |
| Do you take daily naps? | Do you sleep 11 or more hours a day? | Do you experience frightening dreams that relive your Vietnam experience that awaken you out of sleep? |
| Have you ever had an unexplained weight change of 10 pounds or more? | Do you have great difficulty falling asleep at night? | Do you have trouble remembering things? |
| Do you feel unhappy and depressed for weeks at a time? | Do you wake up very early in the morning, but unable to go back to sleep? | Do you feel set apart from other people around you? |
| Does life often look hopeless to you? | Do you find that you are not enjoying activities you once found pleasurable? | Do you have to be on your guard even with your friends? |
| Have you ever wished you were dead and away from it all? | Do you find concentrating difficult? | Do you often get into a violent rage? |
| Is it hard for you to make up your mind? | Do frightening thoughts keep coming back in your mind? | Do sudden noises make you jump or shake badly? |
| Do you have crying spells that seem to come out of the blue? | | Do you often become scared for no good reason? |
| Are you easily upset and irritated? | | Do you have trouble expressing affection for friends or family? |
| Are you considered a nervous person? | | Have you ever felt guilty that you came back from Vietnam while others did not? |
| Do people annoy and irritate you? | | |
| Are you constantly keyed up and jittery? | | |

Table 4

Psychological Symptoms of Potential Agent Orange Exposure[1]

| |
|---|
| Do you get spells of complete exhaustion or fatigue every couple of weeks? |
| Do you usually get up tired and exhausted in the morning? |
| Do you sleep 11 or more hours per day? |
| Do you take daily naps? |
| Do you have great difficulty falling asleep at night? |
| Do you wake up in the middle of the night, unable to return to sleep? |
| Do you wake up very early in the morning, not feeling rested, unable to go back to sleep? |
| Have you had an unexplained weight loss since Vietnam?[2] |
| Do you find that you are not enjoying activities you once found pleasurable? |
| Do you find concentrating difficult? |
| Do you have trouble remembering things? |

[1]Some authorities include depression as a symptom of potential Agent Orange exposure. This particular classification includes only selected symptoms of depression as potential symptoms of Agent Orange exposure.

[2]This question was derived from the original question that asked about weight change in general during the three different time periods. The response that indicated potential exposure is the one used as the basis of the above question.

ignorant of his psychiatrist's diagnosis. Therefore, for the purposes of this study, the presence of psychological illness was assumed only if the subject reported being hospitalized in a mental facility or being treated by a psychiatrist in an outpatient setting.

Seventeen items related to the subject's past medical history in the three time periods. This was designed to identify any symptomatology/illnesses that were not covered in the symptom section. A list of 15 illnesses was provided to determine the subject's family history of illnesses.

Military history was addressed by 14 items that included the following information:

1. Branch of the service
2. Length of time in the service
3. Years spent in Vietnam
4. Military station in Vietnam
5. Job
6. Rank
7. Type of injury sustained in Vietnam, if applicable
8. Type of disciplinary action received, if applicable
9. Type of discharge received

The military history responses were used to construct two additional variables: combat status and level of potential Agent Orange exposure of a given military station in Vietnam. The items referring to type of discharge and history of disciplinary action while in the military were considered to be components of psychosocial adjustment. An additional seven measures of psychosocial

adjustment included the changes over time of the following: marital status, educational attainment, job status, legal status as measured by arrest/conviction history, and substance use as measured by use of tobacco, alcohol and 12 different types of drugs. The demographic section also consisted of seven items that inquired about age, ethnic origin, present marital status, number of children, occupation, income and religious preference.

Further questions inquired about a veteran's knowledge and beliefs concerning Agent Orange. This was believed to be necessary in order to gauge the potential effects of the national attention that has recently been focused on the Agent Orange issue. The responses to the Agent Orange questions were combined into one score that was intended to measure an individual's knowledge and beliefs about Agent Orange relative to peers.

The final section of the questionnaire consisted of 25 items about the respondent's pattern of health care use. The following information was solicited:

1. Status of health insurance coverage (including VA disability classifications).

2. Interval since the subject's last health care visit.

3. Whether the subject had a regular source of health care.

4. The types of health services used by the subject in the past year.

5. The health care facilities used by the subject in the past three years--VA or non-VA.

The last item was an open-ended question to the non-VA-user

about his reason for choosing non-VA facilities over VA facilities.

Derivation

The majority of questionnaire items was derived from other questionnaires. The bulk of the physiological health items was adapted from the Cornell Medical Index Health Questionnaire (1974) and from the Symptom Classification System for Health Services Research (Hurtado & Greenlick, 1971). The psychological health items were a synthesis of the American Psychiatric Association's (1980) diagnostic criteria for major depressive episode and chronic posttraumatic stress disorder (Appendix B). Within the entire symptom section, the designation of physiological and psychological symptoms as symptoms of potential Agent Orange exposure was based on the work of Moses (1979) and Young et al. (1978) on the effects of TCDD in humans.

The demographic material which includes questions on psychosocial adjustment was adapted from a questionnaire utilized by the Utah State Division of Alcoholism and Drugs. The military history section was modeled on the Vietnam Veterans of America Research Questionnaire on Agent Orange (Stellman, J., 1980). The final section of the instrument which concerned health care utilization was based on standardized health interview surveys that have been conducted by the National Center for Health Statistics.

The instrument was not tested for reliability and validity. The investigator assumed face validity because the Cornell Medical Index Health Questionnaire (1974), the source of most of the symptom/

illness items, has been a tried and tested tool for over 30 years, which has not demonstrated strong correlation between the self-report symptoms and the presence of actual clinical illness.

## Pilot Study

The instrument was tested on ten veterans at the Salt Lake City Outreach Center the week of March 15, 1981. After ascertaining the criteria for inclusion, the investigator informed the subjects that this was a pilot test of a questionnaire to be used in a study of the physiological and psychological health problems of the Vietnam veteran. They were told that the results would remain strictly confidential and anonymous.

The subjects were asked to read the cover letter and sign the consent form after reading both. The subjects were then asked to fill out the questionnaire to the best of their ability without asking questions. The completion time was estimated to be 40 to 45 minutes. The subjects were requested to write all of their questions and comments on the sheet at the back of the questionnaire. The following questions were included on the comment sheet:

1. Were the directions confusing?
2. Were any of the words not understandable?
3. Were any of the questions offensive?
4. Exactly how long did it take to finish?

The subjects' completion time ranged from 25 to 60 minutes depending on their state of health. Several areas were identified by the subjects as being in need of clarification and/or revision.

The first ambiguous section was the instruction sheet. When asking the subject to pinpoint the time period (before, during, and/or after Vietnam), in which a symptom occurred, the investigator neglected to define the time periods for the veteran who had served multiple tours in Vietnam. Therefore, the revised directions included a clarification for those veterans (Appendix C). The directions in the pilot study also contained the specification that the subject read the words "frequently" and "often" in the symptom questions to mean "at least once a month." The pilot subjects stated that this direction was difficult to remember. This problem was remedied by substituting a specific time interval ("once a month" in most questions) for the words "frequently" and "often" in the symptom questions. Those questions that use a different time interval were based on the investigator's knowledge as a primary care provider of symptom frequency in the general population.

The subjects suggested that an additional time period be added to the substance use questions. They felt that their present patterns of consumption differed markedly from their patterns during and after Vietnam. Thus, the present time period was added to the other three.

One of the subjects noted that there was no question that addressed the number of times an individual had been married. This suggestion resulted in an item about the number of times that an individual's marital status had changed--before, during, and after Vietnam.

The section of the pilot questionnaire which received the most

criticism, overtly or by omission, was the health needs and utilization section. The questionnaire had listed a number of reasons that an individual might seek health care. The subject was asked to check the reasons he had sought health care the last three times that he needed it. The items on the checklist were not mutually exclusive and, subsequently, caused some confusion. Subjects stated that they had trouble remembering their last three health care visits. This might also have been the explanation for the poor response to the two questions about the specific symptoms and/or illness that prompted them to seek health care. To compensate for the memory lapses, the investigator inquired about the reasons for seeking health care only over the past year.

The last question dealt with the sources of health care used--VA versus non-VA. The pilot subjects almost universally shunned VA services. Many expressed unsolicited negative opinions about the VA's health care facilities. Virtually all the subjects failed to answer the open-ended question about health facilities that were missing in the community.

In the revised questionnaire, a question was added that inquired about a regular source of health care. The missing facility question was deleted and an open-ended question was added to allow non-VA users to express reasons for avoiding VA services.

## Original Procedure

The data collection period began April 15, 1981 and was to have finished at the end of May 1981. Participation by the three

Outreach Centers had been cleared by the national director of the Operation Outreach program. Consent forms and questionnaires (Appendix C) were given to the staff at the Salt Lake City Outreach Center and were mailed to the other two centers. The mailed questionnaires were accompanied by a letter that outlined the protocol for administering the questionnaires (which was identical to that of the pilot study). In addition to the protocol, the centers were asked to provide the following information.

1. The total number of veterans seen per day.
2. The number of veterans who were offered the questionnaire.
3. The number of veterans who refused the questionnaire.
4. The number of veterans not asked with the reasons for exclusion.

The last item was intended to cover any veteran who had been excluded because he was in a traumatic state of mind.

Each veteran who came into the three Outreach Centers for assistance was to be asked to complete the questionnaire. Written consent was to be obtained from each subject, the subjects were to be instructed to read the directions carefully and to complete the questionnaires before leaving the centers.

## Pitfalls

A number of problems occurred that markedly altered the methodology implemented. The first problem, which became evident during the pilot study, concerned the criteria for inclusion. The investigator had mistakenly assumed that the majority of the men who

fought in Vietnam were draftees who would have been separated from the service after their Southeast Asian tour(s). The reality was that a substantial number of potential subjects had enlisted and had, therefore, been in the service for four years or more. Subsequently, the post-Vietnam military separation requirement was dropped from the criteria.

The next problem was encountered at the end of the first week of data collection. This may have resulted from the close year-long personal relationship that the researcher had established with the Salt Lake Outreach Center staff as opposed to the month-old mail/phone relationship with the other centers. At the end of the first week, the Cheyenne and Denver Outreach Centers withdrew, citing negative feedback from their veteran clients as the reason that they no longer desired to participate. Thus, the sample was limited to Utah.

The seriousness of the final problem was not assessed until data collection was nearly finished. The client flow through the Salt Lake Outreach Center had been unusually slow between April 15, 1981 and May 31, 1981, limited to 15 to 25 veterans per day, primarily the same people. Because of the small size of the sample, the data collection period was extended for an additional five weeks, through July 7, 1981. One of the center's counselors agreed to solicit subjects in veteran rap groups that he was conducting in Provo and Logan, Utah. The comparative populations of the three cities, all located in Northern Utah, were similar to the cities proposed in the original sample.

Rap groups are open groups of Vietnam veterans that meet regularly for the exchange of ideas. The group is not moderated by a therapist. Each individual is encouraged to discuss his personal frustrations and to share his feelings honestly about other individuals' expressions. Some veterans express their dissatisfaction with the VA system. Others discuss their lack of success in society. Still others are concerned with society's lack of acceptance of them. Regardless of the topic, the rap group first and foremost serves as an avenue for Vietnam veterans to meet and socialize with other Vietnam veterans.

The Logan sample initially consisted of 37 subjects. However, 31 of the questionnaires were destroyed in transit to Salt Lake City. It was then decided to increase the extant convenience sample to 50 with a snowball sampling method. This source began with a Vietnam veteran in the Salt Lake City area who was personally known to the researcher who, in turn, asked another Vietnam veteran friend to fill out the questionnaire. This solicitation of subjects by word-of-mouth yielded an additional six subjects.

After making the aforementioned modifications the following methodology was reached.

## Final Methodology

### Population

The target population consisted of young (average age 31.6) predominantly White male Vietnam Era veterans who lived in the metropolitan areas of three Northern Utah cities of small (Logan--

city population, 26,844); medium (Provo--city population, 73,907); and large (Salt Lake City--city population, 163,033) sizes (U.S. Census, 1980). It was impossible to determine the number of Vietnam veterans in Northern Utah because the VA's Office of the Controller (1979) included Vietnam veterans and Vietnam Era veterans in the same figure. This figure (57,000) also reflected only the metropolitan area of Salt Lake City.

Sample

The study subjects, a total of 53, consisted of four groups of Vietnam veterans. Twenty-four subjects were obtained from 25 walk-in clients at the Salt Lake City Outreach Center during the period April 15, 1981 to July 7, 1981. Seventeen subjects were obtained from a rap group of 35 in Provo, Utah during the period June 7, 1981 to July 7, 1981. Six subjects were obtained from a rap group of 61 in Logan, Utah between June 7 and July 7, 1981. As mentioned previously, the original number obtained was 37, but 31 were destroyed. The final six subjects were obtained from subjects in the Salt Lake metropolitan area at the request of the investigator.

Duration of membership in the Provo and Logan rap groups ranged from three weeks to seven months. Veterans refusing to participate gave three reasons. First, the individual had not wanted to reveal himself to as great an extent as the questionnaire required, despite the guarantees of confidentiality and anonymity. Second, the individual had not identified his Vietnam experience as

a problem, and, therefore, saw no need for the investigation. Third, the individual had served in a rear area and felt that he had not really participated in the war. This individual was inclined to believe that he was not entitled to have any problems associated with the war. No refusals were recorded because of the questionnaire's length.

Final Criteria for Inclusion

The following criteria for inclusion were met by the subjects:

1. The individual was male.

2. The individual served in Vietnam or its surrounding waters or countries (Cambodia, Laos, or Thailand) during the period August 4, 1964 to March, 1973.

3. The individual had never previously served in a war.

# CHAPTER IV

# DATA ANALYSIS AND DISCUSSION OF FINDINGS

## Data Analysis

The primary data analysis consisted of computation of frequency distributions utilizing the Statistical Package for Social Sciences computer program. In addition, a limited number of correlational analyses were performed, using Kendall's rank-order correlation coefficient (also known as Kendall's tau).

As noted in Table 5, the total sample size was 53. However, the raw data cited in the tables do not always total 53. This was primarily due to the large number of contingency questions in the instrument, which were questions that instructed respondents to go to another question.

For this reason, missing data in the table were classified in one of three ways: a) not appropriate, which signified the total number of respondents who were directed to disregard the item by a contingency question, b) nonresponse, which signified the total number who did not answer the item for any reason other than compliance with a contingency question; or c) not appropriate/nonresponse, which signified the combination of the total number of

Table 5

Subjects by City and Sampling Method

(N=53)

| City | N | Percent |
|---|---|---|
| Salt Lake City | 30 | 56.0 |
| Convenience sample | 24 | 45.0 |
| Snowball sample | 6 | 11.0 |
| Provo | 17 | 32.0 |
| Logan | 6 | 12.0 |
| Totals | 53 | 100.0 |

respondents who were directed to disregard the item and the number of respondents who did not answer the item for other reasons.

Data analysis was divided into the following five sections for clarity of presentation:

1. descriptive characteristics of the sample which include demographic information and data about military service (Tables 6 and 7);
2. the overall physiological and psychological symptoms/illnesses reported and frequence of occurrence before, during and after Vietnam;
3. the physiological and psychological symptoms/illnesses associated with potential Agent Orange exposure that were reported and frequency of occurrence before, during and after Vietnam;
4. patterns of health care utilization including factors that may affect the formation of those patterns, and
5. relationships between selected variables and the total number of symptoms/illnesses reported as well as the total number of potential Agent Orange exposure symptoms reported.

Section One

As seen in Table 5, the 53 Vietnam veterans in the study were drawn from the metropolitan areas of three Northern Utah cities Although age ranged from 25 to 45, 83% of the sample were from 25

Table 6

Summary of Demographic Characteristics

(N=53)

| Sample | N | Percent |
|---|---|---|
| Age | | |
| 25-35 | 44 | 83.0 |
| 36-45 | 9 | 17.0 |
| Ethnic Origin | | |
| White | 44 | 83.0 |
| Black | 3 | 5.0 |
| Chicano/Hispanic | 3 | 5.0 |
| American Indian | 1 | 2.0 |
| Other | 3 | 5.0 |
| Religious Preference | | |
| Latter-Day-Saints | 17 | 33.0 |
| Protestant | 8 | 15.0 |
| Catholic | 4 | 8.0 |
| Other | 9 | 17.0 |
| No preference | 14 | 27.0 |
| Marital Status | | |
| Never married | 2 | 4.0 |
| Married | 26 | 49.0 |
| Divorced | 9 | 17.0 |
| Separated | 5 | 9.0 |
| Non-response | 11 | 21.0 |
| Number of Children | | |
| 0 | 11 | 21.0 |
| 1-2 | 26 | 49.0 |
| 3-4 | 14 | 26.0 |
| 5 or more | 2 | 4.0 |

Table 6 Continued

| Sample | N | Percent |
|---|---|---|
| Occupation | | |
| Semi-skilled | 11 | 21.0 |
| Skilled | 24 | 45.0 |
| Secretarial-clerical | 2 | 4.0 |
| Professional | 9 | 17.0 |
| Non-response | 7 | 13.0 |
| Annual income | | |
| $5,000 or less | 12 | 23.0 |
| $5,100 - 12,000 | 10 | 19.0 |
| $12,100 - 20,000 | 20 | 37.0 |
| $20,100 - 30,000 | 10 | 19.0 |
| $30,100 and over | 1 | 2.0 |
| Highest educational attainment before Vietnam | | |
| Dropped out of high school | 20 | 38.0 |
| High school graduate or equivalent | 21 | 40.0 |
| Vocational training | 3 | 6.0 |
| Some college education | 7 | 13.0 |
| College graduate | 2 | 4.0 |

Table 7

Summary of Military Characteristics

(N=53)

| Sample | N | Percent |
|---|---|---|
| Branch of Service | | |
| Army | 29 | 55.0 |
| Marines | 14 | 26.0 |
| Navy | 3 | 6.0 |
| Air Force | 7 | 13.0 |
| Number of years spent in the service | | |
| 1-4 | 26 | 62.0 |
| 4-10 | 14 | 32.0 |
| > 10 | 2 | 4.0 |
| No response | 1 | 2.0 |
| Years spent in Vietnam | | |
| 1964-1967 | 7 | 13.0 |
| 1968-1971 | 42 | 79.0 |
| 1972-1975 | 2 | 4.0 |
| 1964-1971 | 2 | 4.0 |
| Station in Vietnam | | |
| I Corps | 32 | 60.0 |
| II Corps | 4 | 7.0 |
| III Corps | 2 | 4.0 |
| IV Corps | 2 | 4.0 |
| Two or more of above stations | 10 | 19.0 |
| Waters in or around Vietnam | 1 | 2.0 |
| Countries around Vietnam | 1 | 2.0 |

Table 7 Continued

| Sample | N | Percent |
|---|---|---|
| Station in Vietnam in relationship to areas of aerial Agent Orange spraying | | |
| Potential major exposure | 24 | 46.0 |
| Potential minor exposure | 12 | 22.0 |
| Unable to determine | 17[a] | 32.0 |
| Military duty | | |
| Combat | 29 | 55.0 |
| Rear | 16 | 30.0 |
| Combat and/or rear | 8 | 15.0 |
| Rank | | |
| Enlisted | 50 | 94.0 |
| Officer | 3 | 6.0 |
| Wounded in Vietnam | 42 | 79.0 |
| One body system | 20 | 48.0 |
| Two body systems | 18 | 43.0 |
| Three or more body systems | 4 | 9.0 |

[a]This number was comprised of two groups of respondents:

1) Those who did not specify military station other than by Corps division, e.g. I Corps.

2) Those who reported a station that was so close to an area of major spraying that it was impossible to determine potential exposure.

to 35 years of age (Table 6). The average respondent, as illustrated in Table 6, was a white, married, skilled worker of the Latter Day Saints faith, who had one to two children and an annual income ranging from $12,100 - $20,000. [The occupation classification was based on a scale used by the Salt Lake City Bureau of Economic and Business Research (Giordek, 1979)]. Since the age at which an individual first went to Vietnam was not requested, the best estimate was provided by knowing the present age of the respondent and his highest educational attainment before Vietnam. As seen in Table 6, the majority of the respondents (78%) were split between the "dropped out of high school" and "graduated from high school" categories.

As illustrated in Table 7, respondents were predominantly Army enlisted men who had been in the service for a period of one to four years. Most (79%) had served in Vietnam between the years of 1968 and 1971, and two (4%) respondents served during the period 1964 to 1971. Sixty percent of the sample had been stationed in the I Corps area (Figure 2). Seventy-nine percent of the respondents reported being wounded while in Vietnam.

Two additional types of military service data, combat status and potential Agent Orange exposure level of military station, were extrapolated from the responses to other selected military items. As illustrated in Table 7, 55% of the respondents were in a combat role with an additional 15% reporting a position that <u>may have been</u> combat. Nearly half of the sample (46%) were stationed in areas of Agent Orange spraying that may have resulted in potentially heavy

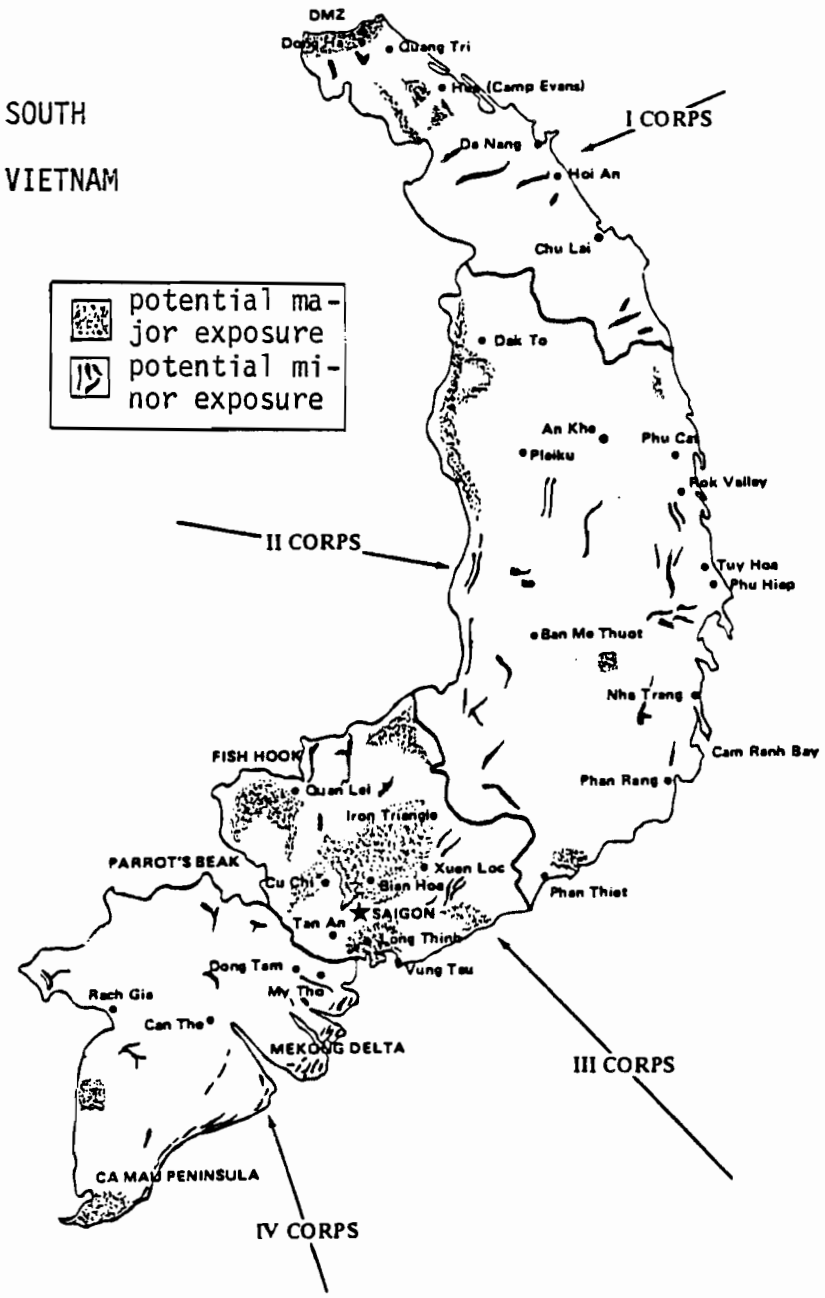


Figure 2

Classification of Potential Agent Orange Exposure by Area Based on Location of Herbicide Orange Missions in South Vietnam

Note. Adapted from Stellman, J., 1980, p. 4 & Report of Comptroller General of the United States, 1979.

exposure.

Classification of military duties were designated as combat, rear, or combat and/or rear positions. This classification was determined by Salt Lake City Outreach Center Counselor Rick Kinman on the basis of the following criteria:

1. branch of military service;
2. military stations, which often included a specification of the unit with which the respondent was assigned;
3. rank, and
4. military duties.

Kinman, who has interviewed more than 5,000 veterans, served with the Marine Corps in Vietnam for 6½ years.

A combat classification was typically given to an infantryman of the lower enlisted ranks (1-4) who served with the Army or Marine Corps. A rear classification was more often applied to officers and men of higher enlisted rank (5-7) who served with the Air Force or Navy in communications or weapons maintenance jobs. The classification of combat and/or support was made if the criteria above were incomplete or nonspecific, thereby making a clear classification impossible.

The utility of this method of combat classification was limited by its reliance on subjective judgments. However, the method of determining combat-noncombat status has not been standardized by Vietnam War researchers, most likely because of the absence of conventional battlelines. Subsequently, researchers have experimented with a number of methods. Glass and Appel (1969) used the number

of men physically wounded to measure the intensity of combat. Applying this method of determining combat status to these data, it can be seen (Table 7) that there is a close correspondence between the total number of respondents wounded in Vietnam (42) and the combined number of respondents classified as combat and combat and/or rear (37).

Determination of a military station's potential level of Agent Orange exposure was made subjectively by comparing the respondent's reported station to the General Accounting Office (GAO) map of Herbicide Orange missions flown from 1965 to 1970. The GAO map was constructed on the basis of the Department of Defense (DOD) computer tapes (HERBS tapes) which was estimated to account for 86% of the total missions flown (Report by the Comptroller General, 1979). Military station was rated in one of the following three ways: potential major exposure, potential minor exposure, and unable to determine.

A classification of potential major exposure was made if the respondent's reported station(s) was located in an area of continuous heavy shading on the GAO map. Potential minor exposure was designated for a reported station(s) that was in or near to an area that was shaded with only one mark on the GAO map. A classification of unable to determine was made for two groups of respondents: those who reported military station in general terms, i.e., by Corps name only and those who specified a military station(s) that was located in such close proximity to an area of heavy shading that it was impossible to make a subjective determination of the potential level

of Agent Orange exposure. The implementation of this classification system was facilitated by the fact that most respondents marked the map enclosed in the questionnaire (Appendix C) with an "X" to signify their military stations. Potential major exposure and potential minor exposure are displayed in Figure 2, which is a combination of the GAO map and the map used in the questionnaire (Stellman, J., 1980).

Some of the limitations of this method of assessing an area's potential Agent Orange exposure have been shared by investigators who have attempted to determine potential human exposure to Agent Orange (Report by the Comptroller General, 1979; Stellman, S., 1980). The problem lay with the definition of exposure. While some researchers (Young et al., 1978) believed that direct skin exposure was the only way Agent Orange could enter the human body, others like Epstein (1980) suggested that air, food, and water may all be potential routes of entry.

If an agreement could be reached on what constituted exposure, the question would remain: How is degree of exposure determined? For example, would a veteran whose clothing was soaked with Agent Orange at one point in time have suffered a heavier degree of exposure than a veteran who, on a daily basis, breathed suspended droplets of Agent Orange in the air, perhaps over a period of weeks?

Because of the above problems, researchers have been forced to presume that Agent Orange exposure has taken place on the basis of one or more of the following criteria:

1. Nature of military job, [Air Force veterans who participated in the aerial Agent Orange spraying missions were presumed to have had heavy exposure to Agent Orange (Young et al., 1978)].

2. Veteran self-reports of exposure incidents (Stellman, S., 1980).

3. Presence in or near areas of spraying on the day of an Agent Orange spraying mission (Report by the Comptroller General, 1979).

This investigator did not assume Agent Orange exposure in any subject. However, it was hoped, based on knowledge of the DOD's application of Agent Orange in Vietnam (Appendix A) coupled with the locations of Agent Orange missions, that a reasonable estimate of the potential Agent Orange exposure level of a given area could be made. The classification of potential major exposure was assumed to have the greatest degree of accuracy, because the heavy shading on the GAO map signified repeated missions flown in the same area. It was estimated that 2.18 million gallons of Agent Orange was sprayed in the I Corps alone from 1966 to 1969 (Report by the Comptroller General, 1979). On the other hand, the classifications of potential minor exposure and unable to determine may have been applied to areas with similar levels of exposure. Indeed, since areas signified with one slash on the GAO map may really have represented heavy spraying on a very small geographic area, a classification, of potential major exposure may have been appropriate to the latter area, which, with this system of classification had been

previously designated as potential minor exposure.

Section Two

The types of symptomatology/illnesses reported by the subjects as illustrated in Tables 8, 9 and 10, responded to Research Question 1a:

> What types of physiological and psychological illnesses and symptomatology are reported by the Vietnam veteran?

Physiological symptomatology/illnesses was divided into systems of the body. Mean numbers of symptoms/illnesses were reported per system as well as total numbers of symptoms/illnesses reported. The latter also were represented as percentages based on the total number of possible symptoms/illnesses per system. The terms symptoms/illnesses or symptomatology/illnesses will be replaced with the simpler terms symptoms and symptomatology in future textual discussions. Other than when the total number of reported psychological symptoms is examined alone, the terms symptoms/symptomatology should be read as symptoms/illnesses.

The mean number of symptoms reported per system ranged generally from 3 to 6. As seen in Table 8, the highest mean number of reported symptoms (8.81) occurred in the gastrointestinal (GI) system ($n$ = 14). The GI system was distinctive for two additional reasons. First, the GI system was the only system in which respondents reported symptoms up to the total possible per system, Second, GI respondents reported no fewer than five symptoms, whereas a number of respondents in all but the eyes and ears system reported as low as zero or one symptom per system. As illustrated in Table 8, the

Table 8

Total Number of Physiological Symptoms/Illnesses Reported for Selected Body Systems

| Number of Symptoms | Brain | | Eyes & Ears | | Mouth, Nose & Throat (MNT) | |
|---|---|---|---|---|---|---|
| | (N) | % | (N) | % | (N) | % |
| 0 | (3) | 5.0 | (0) | 0.0 | (1) | 2.0 |
| 1 | (2) | 4.0 | (0) | 0.0 | (2) | 4.0 |
| 2 | (5) | 9.0 | (2) | 5.0 | (6) | 11.0 |
| 3 | (8) | 15.0 | (10) | 19.0 | (5) | 10.0 |
| 4 | (13) | 25.0 | (7) | 13.0 | (7) | 13.0 |
| 5 | (4) | 8.0 | (10) | 19.0 | (6) | 11.0 |
| 6 | (9) | 17.0 | (5) | 9.0 | (6) | 11.0 |
| 7 | (6) | 11.0 | (7) | 13.0 | (9) | 17.0 |
| 8 | (1) | 2.0 | (5) | 9.0 | (5) | 9.0 |
| 9 | (1) | 2.0 | (1) | 2.0 | (1) | 2.0 |
| 10 | (1) | 2.0[a] | (5) | 9.0 | (5) | 10.0[a] |
| 11 | ---------- | | (1) | 2.0[a] | ---------- | |
| 12 | | | ---------- | | | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System | (11) | | (14) | | (15) | |
| Mean Number of Symptoms Possible per System | 4.36 | | 5.68 | | 5.38 | |

| | Skin | | Musculoskeletal (MS) | | Lungs & Heart | |
|---|---|---|---|---|---|---|
| 0 | (3) | 6.0 | (3) | 6.0 | (3) | 6.0 |
| 1 | (3) | 6.0 | (8) | 15.0 | (1) | 2.0 |
| 2 | (9) | 17.0 | (6) | 11.0 | (7) | 13.0 |
| 3 | (8) | 15.0 | (6) | 11.0 | (5) | 9.0 |

Table 8 Continued

| Number of Symptoms | Skin | | Musculoskeletal (MS) | | Lungs & Heart | |
|---|---|---|---|---|---|---|
| | (N) | % | (N) | % | (N) | % |
| 4 | (12) | 23.0 | (8) | 15.0 | (3) | 6.0 |
| 5 | (8) | 15.0 | (11) | 21.0 | (7) | 13.0 |
| 6 | (5) | 9.0 | (5) | 9.0 | (4) | 8.0 |
| 7 | (5) | 9.0[a] | (5) | 9.0 | (6) | 10.0 |
| 8 | ---------- | | (3) | 6.0[a] | (3) | 6.0 |
| 9 | | | ---------- | | (2) | 4.0 |
| 10 | | | | | (5) | 9.0 |
| 11 | | | | | (1) | 2.0 |
| 12 | | | | | (4) | 8.0 |
| 13 | | | | | (1) | 2.0 |
| 14 | | | | | (0) | 0.0 |
| 15 | | | | | (0) | 0.0 |
| 16 | | | | | (1) | 2.0[a] |
| 17 | | | | | ---------- | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System | ( 8) | | (12) | | (19) | |
| Mean Number of Symptoms Possible Per System | 3.73 | | 3.78 | | 6.09 | |

| | Gastrointestinal (GI) | | Genitourinary (GU) | | Sexuality | |
|---|---|---|---|---|---|---|
| 0 | (0) | 0.0 | (9) | 17.0 | (10) | 19.0 |
| 1 | (0) | 0.0 | (6) | 11.0 | (5) | 9.0 |
| 2 | (0) | 0.0 | (11) | 20.0 | (17) | 32.0 |
| 3 | (0) | 0.0 | (7) | 13.0 | (4) | 7.0 |
| 4 | (0) | 0.0 | (10) | 19.0 | (10) | 19.0 |
| 5 | (3) | 6.0 | (4) | 8.0 | (3) | 6.0 |

Table 8 Continued

| Number of Symptoms | Gastrointestinal (GI) | | Genitourinary (GU) | | Sexuality | |
|---|---|---|---|---|---|---|
| | (N) | % | (N) | % | (N) | % |
| 4 | (0) | 0.0 | (10) | 19.0 | (10) | 19.0 |
| 5 | (3) | 6.0 | (4) | 8.0 | (3) | 7.0 |
| 6 | (7) | 13.0 | (2) | 4.0 | (4) | 7.0[a] |
| 7 | (7) | 13.0 | (2) | 4.0 | ---------- | |
| 8 | (8) | 15.0 | (2) | 4.0[a] | | |
| 9 | (6) | 11.0 | ---------- | | | |
| 10 | (9) | 17.0 | | | | |
| 11 | (7) | 13.0 | | | | |
| 12 | (3) | 6.0 | | | | |
| 13 | (2) | 4.0 | | | | |
| 14 | (1) | 2.0 | | | | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System | (14) | | (16) | | (7) | |
| Mean Number of Symptoms Per System | 8.81 | | 2.85 | | 2.47 | |

[a]This symbol signifies that no responses exceeded this number.

Table 9

Total Number of Psychological Symptoms Reported

| Number of Symptoms | Psychological | |
|---|---|---|
| | N | % |
| 0 | (0) | 0.0 |
| 1 | (0) | 0.0 |
| 2 | (0) | 0.0 |
| 3 | (0) | 0.0 |
| 4 | (1) | 2.0 |
| 5 | (1) | 2.0 |
| 6 | (0) | 0.0 |
| 7 | (0) | 0.0 |
| 8 | (3) | 6.0 |
| 9 | (1) | 2.0 |
| 10 | (3) | 6.0 |
| 11 | (6) | 11.0 |
| 12 | (5) | 9.0 |
| 13 | (3) | 6.0 |
| 14 | (8) | 15.0 |
| 15 | (6) | 11.0 |
| 16 | (5) | 9.0 |
| 17 | (6) | 11.0 |
| 18 | (4) | 8.0 |
| 19 | (1) | 2.0 |
| 20 | ---------- | ----------[a] |
| Total | (53) | 100.0 |
| Total Number of Symptoms Possible | (35) | |
| Mean Number of Symptoms | 13.43 | |

[a]This symbol signifies that no responses exceeded this number.

Table 10

Number of Potential Characteristics of

Psychological Illness Reported

| Sample | N | Percent |
|---|---|---|
| Hospitalized for mental illness | | |
| Yes | 12[a] | 23.0 |
| No | 41 | 77.0 |
| Treatment by psychiatrist or other therapist outside of hospital | | |
| Yes | 17 | 32.0 |
| No | 3 | 6.0 |
| Not appropriate/Non-response | 33[b] | 62.0 |

[a]All of the respondents marked "after Vietnam" as the time period of the hospitalization. Two respondents cited an additional time period, one "before Vietnam" and one "during Vietnam".

[b]This figure was comprised of two groups. Respondents that were designated as not appropriate answered "Yes" to the item on mental illness hospitalization ($n$ = 12) and thus were not asked to respond. Of the remaining non-response group, non-response may have been high because the boxes for checking "Yes" or "No" were inadvertently omitted.

two largest numbers of zero reported symptoms occurred in the genitourinary (GU) and sexuality systems, 17% and 19% respectively.

Additional information that responded to Research Question 1a is found in Tables 9 and 10. The presence of psychological symptomatology has often been estimated through a self-report method whereas the presence of psychological illness has only been inferred in this fashion. The total number of psychological symptoms reported can be seen in Table 9. Although no respondent reported fewer than four symptoms, it was interesting to note that only two respondents reported fewer than eight symptoms. The mean number of psychological symptoms reported was 13.43 ($n$ = 35).

It was hoped that some measure of psychological illness could be obtained by asking respondents about past hospitalizations for mental illness or past treatment by a psychiatrist outside a hospital setting (Table 10). Although this measure would, in all probability, lack reliability if applied to the general population, it may have more potential to predict actual psychological illness in a population of Vietnam veterans. Researchers have found that Vietnam veterans have often avoided seeking mental health care despite the presence of significant psychological symptoms (Nace et al., 1977; Defazio et al., 1975). Subsequently, it may be valid to assume that respondents who did report seeking mental health care were prompted to take this action by severe clinical dysfunction. In this sample, this number could well be comprised of half of the respondents -- 23% of the respondents who reported post-Vietnam hospitalization for mental illness and an additional 32%

who reported outpatient psychiatric treatment (Table 10).

The limitation of this measurement method stemmed from the fact that the "treatment by psychiatrist out of hospital" item was a contingency question that was designated to be answered only by respondents who denied hospitalization for mental illness (Appendix C). However, 21 of those respondents did not answer the former item. The reason for this level of non-response was, in part, due to the fact that the boxes for checking "yes" and "no" were inadvertently omitted. Because of this inconsistency, respondents were undoubtedly confused by the item.

The response to Research question 1b:

> How do these reported illnesses and symptomatology occur during the time periods before, during and after Vietnam?

is shown in Tables 11 and 12. As seen in Tables 8,9, and 10, comparison of system symptom means was complicated by the fact that n varied between systems. Taking this fact into account, it still can be seen that a pattern of increasing mean numbers of reported physiological and psychological symptoms emerged over the three time periods in all body systems (except sexuality for which no "before Vietnam" and "during Vietnam" time periods were listed). Typically, the mean number of symptoms reported for the "during Vietnam" time period fell halfway between the means of the "before Vietnam" and "after Vietnam" time periods (Tables 11 and 12).

In the physiological category of symptoms, respondents of all but one system reported 13 to 22 fold increases in reported symptoms from the "before Vietnam" time period to the "after Vietnam"

Table 11

Total Number of Physiological Symptoms/Illnesses Reported for Selected Systems in Relationship to Service in Vietnam

| Number of Symptoms | Brain | | | | | | Eyes and Ears | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 0 | (41) | 77.0 | (12) | 23.0 | (4) | 8.0 | (32) | 60.0 | (7) | 13.0 | (2) | 4.0 |
| 1 | (10) | 19.0 | (9) | 17.0 | (4) | 8.0 | (18) | 34.0 | (7) | 13.0 | (4) | 8.0 |
| 2 | (2) | 4.0[a] | (9) | 17.0 | (9) | 17.0 | (1) | 2.0 | (14) | 26.0 | (4) | 8.0 |
| 3 | | | (12) | 23.0 | (11) | 21.0 | (2) | 4.0[a] | (12) | 24.0 | (11) | 21.0 |
| 4 | | | (5) | 8.0 | (6) | 11.0 | | | (6) | 11.0 | (8) | 15.0 |
| 5 | | | (3) | 6.0 | (6) | 11.0 | | | (5) | 9.0 | (8) | 15.0 |
| 6 | | | (2) | 4.0 | (5) | 9.0 | | | (1) | 2.0 | (6) | 11.0 |
| 7 | | | (1) | 2.0[a] | (5) | 9.0 | | | (1) | 2.0[a] | (4) | 8.0 |
| 8 | | | | | (2) | 4.0 | | | | | (4) | 8.0 |
| 9 | | | | | (0) | 0.0 | | | | | (1) | 2.0 |
| 10 | | | | | (1) | 2.0[a] | | | | | (0) | 0.0 |
| 11 | | | | | | | | | | | (1) | 2.0 |

Table 11 Continued

| Number of Symptoms | Brain | | | | | | Eyes and Ears | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 12 | | | | | | | | | | | ----------[a] | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System Based on Time Period | (11) | | (11) | | (11) | | (14) | | (14) | | (14) | |
| Mean Number of Symptoms Per System Based on Time Period | .26 | | 2.21 | | 3.77 | | .15 | | 1.99 | | 3.26 | |

Table 11 Continued

| Number of Symptoms | Mouth, Nose & Throat (MNT) | | | | | | Skin | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 0 | (45) | 85.0 | (17) | 32.0 | (1) | 2.0 | (51) | 96.0 | (14) | 26.0 | (5) | 9.0 |
| 1 | (5) | 9.0 | (12) | 23.0 | (3) | 6.0 | (2) | 4.0 | (10) | 19.0 | (2) | 4.0 |
| 2 | (2) | 4.0 | (8) | 14.0 | (5) | 9.0 | ---------[a] | | (8) | 15.0 | (10) | 19.0 |
| 3 | (1) | 2.0 | (7) | 13.0 | (9) | 17.0 | | | (13) | 25.0 | (9) | 17.0 |
| 4 | ----------[a] | | (2) | 4.0 | (5) | 9.0 | | | (8) | 15.0 | (13) | 25.0 |
| 5 | | | (3) | 6.0 | (9) | 17.0 | | | ----------[a] | | (6) | 11.0 |
| 6 | | | (1) | 2.0 | (3) | 6.0 | | | | | (6) | 11.0 |
| 7 | | | (3) | 6.0 | (8) | 15.0 | | | | | (2) | 4.0 |
| 8 | | | ----------[a] | | (5) | 9.0 | | | | | ----------[a] | |
| 9 | | | | | (2) | 4.0 | | | | | | |
| 10 | | | | | (3) | 6.0 | | | | | | |
| 11 | | | | | ----------[a] | | | | | | | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible per System | (13) | | (13) | | (15)[b] | | (5) | | (5) | | (8)[b] | |
| Mean Number of Symptoms Per System Based on Time Period | .23 | | 1.87 | | 5.04 | | .04 | | 1.83 | | 3.42 | |

Table 11 Continued

| Number of Symptoms | Musculoskeletal (MS) | | | | | | Lungs and Heart | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 0 | (40) | 75.0 | (20) | 38.0 | (4) | 8.0 | (37) | 70.0 | (13) | 25.0 | (3) | 6.0 |
| 1 | (8) | 15.0 | (15) | 28.0 | (8) | 15.0 | (10) | 19.0 | (9) | 18.0 | (3) | 6.0 |
| 2 | (3) | 6.0 | (8) | 15.0 | (10) | 19.0 | (6) | 11.0[a] | (5) | 9.0 | (7) | 13.0 |
| 3 | (2) | 4.0[a] | (2) | 4.0 | (7) | 13.0 | --- | --- | (10) | 19.0 | (7) | 13.0 |
| 4 | --- | --- | (6) | 11.0 | (11) | 21.0 | | | (3) | 6.0 | (3) | 6.0 |
| 5 | | | (0) | 0.0 | (6) | 11.0 | | | (5) | 9.0 | (7) | 13.0 |
| 6 | | | (2) | 4.0[a] | (6) | 11.0 | | | (3) | 6.0 | (2) | 4.0 |
| 7 | | | --- | --- | (2) | 4.0[a] | | | (1) | 2.0 | (5) | 8.0 |
| 8 | | | | | --- | --- | | | (3) | 6.0 | (3) | 6.0 |
| 9 | | | | | | | | | (0) | 0.0 | (4) | 8.0 |
| 10 | | | | | | | | | (1) | 2.0[a] | (6) | 11.0 |
| 11 | | | | | | | | | --- | --- | (2) | 4.0 |
| 12 | | | | | | | | | | | (1) | 2.0 |
| 13 | | | | | | | | | | | | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System Based on Time Period | (12) | | (12) | | (12) | | (19) | | (19) | | (19) | |

Table 11 Continued

| Number of Symptoms | Musculoskeletal (MS) | | | | | | Lungs and Heart | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| Mean Number of Symptoms Per System Based on Time Period | .42 | | 1.38 | | 3.23 | | .42 | | 2.74 | | 5.43 | |

| | Gastrointestinal (GI) | | | | | | Genitourinary (GU) | | | | | | Sexuality | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 0 | (44) | 83.0 | (20) | 38.0 | (8) | 15.0 | (47) | 89.0 | (20) | 38.0 | (13) | 25.0 | N.A.[c] | | N.A.[c] | | (10) | 19.0 |
| 1 | (9) | 17.0[a] | (8) | 15.0 | (6) | 11.0 | (5) | 9.0 | (10) | 19.0 | (8) | 15.0 | | | | | (5) | 9.0 |
| 2 | ---------[a] | | (9) | 16.0 | (8) | 15.0 | (1) | 2.0[a] | (9) | 17.0 | (14) | 26.0 | | | | | (17) | 32.0 |
| 3 | | | (3) | 6.0 | (7) | 13.0 | --------[a] | | (7) | 13.0 | (6) | 11.0 | | | | | (4) | 7.0 |
| 4 | | | (3) | 6.0 | (6) | 11.0 | | | (5) | 9.0 | (7) | 13.0 | | | | | (10) | 19.0 |
| 5 | | | (6) | 11.0 | (8) | 15.0 | | | (1) | 2.0 | (1) | 2.0 | | | | | (3) | 7.0 |
| 6 | | | (2) | 4.0 | (4) | 8.0 | | | (1) | 2.0[a] | (3) | 6.0 | | | | | (4) | 7.0 |
| 7 | | | (1) | 2.0 | (4) | 8.0 | | | --------[a] | | (1) | 2.0 | | | | | | |

Table 11 Continued

| Number of Symptoms | Gastrointestinal (GI) | | | | | | Genitourinary (GU) | | | | | | Sexuality | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 8 | | | (1) | 2.0[a] | (0) | 0.0 | | | | | --------[a] | | | | | | | |
| 9 | | | -------- | | (1) | 2.0 | | | | | | | | | | | | |
| 10 | | | | | (1) | 2.0[a] | | | | | | | | | | | | |
| 11 | | | | | -------- | | | | | | | | | | | | | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System Based on Time Period | (14) | | (14) | | (14) | | (16) | | (16) | | (16) | | | | | | (6) | |

Table 11 Continued

| Number of Symptoms | Gastrointestinal (GI) | | | | | | Genitourinary (GU) | | | | | | Sexuality | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| Mean Number of Symptoms Based on Time Period | .17 | | 1.96 | | 3.36 | | .13 | | 1.51 | | 2.13 | | | | | | 2.45 | |

[a]This symbol signifies that no responses exceeded this number.

[b]The difference in the total numbers of symptoms possible per time period is the result of having counted all questions that began, "Since you returned from Vietnam_____", in the "after Vietnam" time period only.

[c]This symbol signifies that the "before Vietnam" and "during Vietnam" time periods did not apply in this system. This was because all of the items within the system were phrased "Since you returned from Vietnam_____", and were subsequently classified in the "after Vietnam" time period.

Table 12

Total Number of Psychological Symptoms Reported In Relationship to Service in Vietnam

| Number of Symptoms | Psychological | | | | | |
|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % |
| 0 | (47) | 89.0 | (10) | 19.0 | (0) | 0.0 |
| 1 | (4) | 7.0 | (2) | 4.0 | (0) | 0.0 |
| 2 | (0) | 9.0 | (4) | 8.0 | (0) | 0.0 |
| 3 | (1) | 2.0 | (5) | 9.0 | (0) | 0.0 |
| 4 | (1) | 2.0[a] | (7) | 12.0 | (1) | 2.0 |
| 5 | ---------- | | (6) | 11.0 | (2) | 4.0 |
| 6 | | | (7) | 12.0 | (2) | 4.0 |
| 7 | | | (5) | 9.0 | (2) | 4.0 |
| 8 | | | (3) | 6.0 | (2) | 4.0 |
| 9 | | | (1) | 2.0 | (1) | 2.0 |
| 10 | | | (1) | 2.0 | (0) | 0.0 |
| 11 | | | (1) | 2.0 | (7) | 13.0 |
| 12 | | | (1) | 2.0 | (7) | 13.0 |
| 13 | | | ---------- | [a] | (7) | 13.0 |
| 14 | | | | | (7) | 13.0 |
| 15 | | | | | (8) | 15.0 |
| 16 | | | | | (6) | 11.0 |
| 17 | | | | | (0) | 0.0 |
| 18 | | | | | (1) | 2.0[a] |
| 19 | | | | | ---------- | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per Time Period | (35) | | (35) | | (35) | |
| Mean Number of Symptoms Per Time Period | .21 | | 4.26 | | 12.25 | |

[a]This symbol signifies that no responses exceeded this number.

time period. The exception was found in the respondents of the musculoskeletal (MS) system, who reported only a 7½ fold increase in symptoms over the above time periods (Table 11). However, in five of those systems (brain, MS, lungs and heart, GI and GU) the greatest increase in reported symptoms occurred between the before and during Vietnam time periods.

It should be noted that two other systems, mouth, nose and throat (MNT) and skin, which appeared on the surface to have disproportionately large increases in mean numbers of reported symptoms, had different n's in the "before Vietnam" and the "after Vietnam" time periods (Table 11). This discrepancy in n's was due to the fact that each of those systems contained several questions that began with the phrase, "Since you returned from Vietnam_____", the responses to which were classified in the "after Vietnam" time period only. However, regardless of this difference in n's, both systems demonstrated a dramatic change in reported symptoms from the "before Vietnam" to the "after Vietnam" time periods. As seen in Table 11, 96% of the sample reported no symptoms in the skin system for the "before Vietnam" time period, whereas only 9% reported no symptoms in the "after Vietnam" time period. Similarly, 85% of the respondents in the MNT system reported no symptoms in the "before Vietnam" time period, while only 2% reported no symptoms in the "after Vietnam" time period.

As illustrated in Table 12, the total number of reported psychological symptoms increased markedly from the "before Vietnam" time period to the "during Vietnam" time period as well as from the

"during Vietnam" time period to the "after Vietnam" time period. However, the larger degree of change, an increase of 20 fold, was manifested between the former two time periods. Again, this can best be illustrated by reporting the absence of reported symptoms. For the "before Vietnam" time period, 89% of the sample reported no symptoms. The percentage of reportedly symptom-free respondents dropped to 19% for the "during Vietnam" time period, and to zero in the "after Vietnam" time period. The data in the "after Vietnam" time period are additionally noteworthy because they show that the majority of the respondents (78%) reported 11 to 16 symptoms (n = 35).

Section Three

As illustrated in Tables 13 and 14, the number of reported symptoms that have been associated with potential Agent Orange exposure were related to Research Question 2a:

> Of the total symptomatology/illnesses reported after Vietnam, how many symptoms/illnesses are associated with potential Agent Orange exposure?

As mentioned previously in the discussion of the instrument, the potential Agent Orange exposure symptoms (Tables 2 and 4, pp. 49 and 53) were derived from the extrapolations that several authors (Young et al., 1978; Moses, 1979) made from a multitude of international industrial accidents in TCDD-producing plants. Technically speaking, the symptoms that were identified by those researchers are potential symptoms of TCDD (dioxin) exposure. However, most investigators who have researched Vietnam veterans for

Table 13

Number of Physiological Symptoms/Illnesses of Potential Agent Orange Exposure Reported for Selected Body Systems

| Number of Symptoms | Brain | | Eyes and Ears | | Mouth, Nose, & Throat (MNT) | |
|---|---|---|---|---|---|---|
| | (N) | % | (N) | % | (N) | % |
| 0 | (9) | 17.0 | (5) | 9.0 | (16) | 30.0 |
| 1 | (12) | 23.0 | (3) | 6.0 | (20) | 38.0 |
| 2 | (8) | 15.0 | (8) | 15.0 | (17) | 32.0 |
| 3 | (20) | 38.0 | (19) | 36.0 | | |
| 4 | (4) | 7.0 | (7) | 13.0 | | |
| 5 | | | (6) | 11.0 | | |
| 6 | | | (4) | 8.0 | | |
| 7 | | | (1) | 2.0 | | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System | (4) | | (7) | | (2) | |
| Mean Number of Symptoms Per System | 1.96 | | 3.11 | | 1.02 | |

| | Skin | | Musculoskeletal (MS) | | Lungs & Heart | |
|---|---|---|---|---|---|---|
| 0 | (5) | 9.0 | (10) | 19.0 | (21) | 40.0 |
| 1 | (10) | 19.0 | (10) | 19.0 | (32) | 60.0 |
| 2 | (14) | 27.0 | (19) | 36.0 | | |
| 3 | (10) | 19.0 | (9) | 17.0 | | |
| 4 | (8) | 15.0 | (5) | 9.0 | | |
| 5 | (5) | 9.0 | | | | |
| 6 | (1) | 2.0 | | | | |

Table 13 Continued

| Number of | Skin | | Musculoskeletal (MS) | | Lungs & Heart | |
|---|---|---|---|---|---|---|
| | (N) | % | (N) | % | (N) | % |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System | (6) | | (4) | | (1) | |
| Mean Number of Symptoms Per System | 2.47 | | 1.79 | | .60 | |

| | Gastrointestinal (GI | | Genitourinary (GU) | | Sexuality | |
|---|---|---|---|---|---|---|
| 0 | (10) | 19.0 | (40) | 75.0 | (10) | 19.0 |
| 1 | (8) | 15.0 | (13) | 25.0 | (5) | 9.0 |
| 2 | (8) | 15.0 | | | (17) | 32.0 |
| 3 | (7) | 13.0 | | | (4) | 7.0 |
| 4 | (9) | 17.0 | | | (10) | 19.0 |
| 5 | (7) | 13.0 | | | (3) | 6.0 |
| 6 | (4) | 8.0 | | | (4) | 8.0 |
| 7 | ---------- | [a] | | | | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System | (10) | | (1) | | (6) | |
| Mean Number of Symptoms Per System | 2.64 | | .25 | | 2.45 | |

[a]This symbol signifies that no responses exceeded this number.

Table 14

Number of Psychological Symptoms of Potential Agent Orange Exposure

| Number of Symptoms | Psychological | |
|---|---|---|
| | (N) | % |
| 0 | (0) | 0.0 |
| 1 | (1) | 2.0 |
| 2 | (2) | 4.0 |
| 3 | (3) | 6.0 |
| 4 | (5) | 9.0 |
| 5 | (5) | 9.0 |
| 6 | (10) | 19.0 |
| 7 | (6) | 11.0 |
| 8 | (12) | 23.0 |
| 9 | (9) | 17.0 |
| 10 | ---------- | [a] |
| Total | (53) | 100.0 |
| Total Number of Symptoms Possible | (11) | |
| Mean Number of Symptoms | 6.38 | |

[a]This symbol signifies that no responses exceeded this number.

the potential effects of herbicide exposure have focused on Agent Orange rather than its dioxin contaminant which was contained in other herbicides as well (Appendix A). Since Agent Orange was the most widely used herbicide in Vietnam from 1965 to 1970, it was assumed that Agent Orange spraying accounted for most of the dioxin deposited in Vietnam. Subsequently, potential Agent Orange exposure translates to potential dioxin exposure in the case of the Vietnam veteran.

There is considerable disagreement as to what qualifies as a symptom of exposure to Agent Orange. To this date, the VA has acknowledged chloracne as the only legitimate symptom of Agent Orange exposure. Chloracne is defined as an acneiform dermatitis that is characterized by comedones, keratin cysts, pustules, papules, and abscesses (Joint ad hoc Working Group, 1978). In layman's terms, chloracne is a severe form of acne that recurs over time which appears on the body surface in areas that are not normally associated with acne formation, such as groin and armpits.

Other researchers have expressed the belief that symptoms of Agent Orange exposure may vary widely according to the particular individual. Mindful of the quandary of the scientific community concerning the long-term health effects of Agent Orange exposure, the researcher has identified all of the symptoms in this section as potential Agent Orange exposure symptoms.

As seen in Table 13, all but the GI system respondents reported up to the maximum number of possible physiological potential Agent Orange exposure symptoms. Although the highest percentage

of respondents (75%) who reported no symptoms was found in the GU system, it should be noted that only one symptom was listed in that system. Similarly, the highest percentages of reported symptoms, 32% in the MNT system and 60% in the lungs and heart system, were found in systems with two symptoms and one symptom, respectively. Without controlling for system sample size, the highest mean number of symptoms were reported in the eyes and ears system.

Prior to the analysis of the reported psychological symptoms of potential Agent Orange exposure, it must be reiterated that no "pure" psychological symptoms of potential Agent Orange exposure have been identified. In other words, each psychological symptom that has been associated with Agent Orange exposure by one researcher has been attributed to a psychiatric etiology, such as depression, by another researcher. Because nearly all of the previous research on the Vietnam veteran's reported psychological symptoms has focused on symptoms of depression or posttraumatic stress disorder (Appendix B), it was believed that a tabular comparison of the psychological symptoms of potential Agent Orange exposure with the symptoms of the aforementioned psychiatric problems would be meaningful for the reader (Tables 3 and 4, pp. 52-53).

As seen in Table 14, the reported psychological symptoms of Agent Orange exposure ranged from 1 to 9 ($\underline{n}$ = 11). The majority of the respondents (70%) reported from 6 to 9 symptoms, the mean number of reported symptoms being 6.38.

Research question 2b:

How do the reported potential Agent Orange exposure

symptoms/illnesses categorize into physiological and psychological components in relation to the three time periods?

was addressed by the data presented in Tables 15 and 16. These data represented the numbers of reported physiological and psychological symptoms of potential Agent Orange exposure according to the time periods before, during and after Vietnam.

The physiological findings can be analyzed in several ways. The respondents to three body systems (brain, eyes and ears, and skin) reported similar patterns of potential Agent Orange exposure symptoms. Respondents in all three systems reported a 23 to 27 fold increase in the means of potential Agent Orange exposure symptoms for the "before Vietnam" time period to the "after Vietnam" time period. Interestingly, the mean numbers of reported symptoms per system for the "after Vietnam" time period was only twice the mean numbers of reported symptoms for the "during Vietnam" period, indicating that the majority of the increase in potential Agent Orange symptoms reported (Table 15) occurred between the first two time periods (It must be noted that the n for the skin system's "after Vietnam" time period was larger than the n for the "during Vietnam" time period. However, this should have served to increase the difference in the mean numbers of symptoms between those two time periods.)

As seen in Table 15, the total number of respondents within five body systems (brain, eyes and ears, skin, MS, and GI) showed a 73% - 88% decrease in the reported number of zero symptoms of potential Agent Orange exposure for the time period before Vietnam

Table 15

Number of Physiological Symptoms/Illnesses of Potential Agent Orange Exposure Reported

For Selected Systems In Relationship to Service in Vietnam

| Number of Symptoms | Brain | | | | | | Eyes and Ears | | | | | | Mouth, Nose & Throat (MNT) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 0 | (51) | 96.0 | (24) | 45.0 | (9) | 17.0 | (49) | 92.0 | (11) | 21.0 | (5) | 9.0 | N.A.[b] | | N.A.[b] | | (19) | 36.0 |
| 1 | (2) | 4.0[a] | (13) | 24.0 | (12) | 23.0 | (4) | 8.0[a] | (12) | 23.0 | (3) | 6.0 | | | | | (18) | 34.0 |
| 2 | -------- | | (12) | 23.0 | (8) | 15.0 | -------- | | (14) | 26.0 | (9) | 17.0 | | | | | (16) | 30.0 |
| 3 | | | (4) | 8.0[a] | (20) | 37.0 | | | (9) | 17.0 | (18) | 33.0 | | | | | | |
| 4 | | | -------- | | (4) | 8.0 | | | (5) | 9.0 | (9) | 17.0 | | | | | | |
| 5 | | | | | | | | | (2) | 4.0[a] | (4) | 8.0 | | | | | | |
| 6 | | | | | | | | | -------- | | (4) | 8.0 | | | | | | |
| 7 | | | | | | | | | | | (1) | 2.0 | | | | | | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | | | | | (53) | 100.0 |
| Total Number of Symptoms Possible Per System Based on Time Period | (4) | | (4) | | (4) | | (7) | | (7) | | (7) | | | | | | (2) | |

Table 15 Continued

| Number of Symptoms | Brain | | | | | | Eyes and Ears | | | | | | Mouth, Nose & Throat (MNT) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| Mean Number of Symptoms Per System | .04 | | .93 | | 1.96 | | .08 | | 1.83 | | 3.06 | | | | | | .94 | |

| | Skin | | | | | | Musculoskeletal | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 0 | (51) | 96.0 | (20) | 37.0 | (8) | 15.0 | (48) | 91.0 | (31) | 58.0 | (10) | 18.0 |
| 1 | (2) | 4.0[a] | (12) | 23.0 | (8) | 15.0 | (3) | 5.0 | (12) | 23.0 | (12) | 23.0 |
| 2 | | | (17) | 32.0 | (16) | 30.0 | (2) | 4.0[a] | (8) | 15.0 | (19) | 36.0 |
| 3 | | | (4) | 8.0[a] | (10) | 19.0 | | | (2) | 4.0[a] | (9) | 17.0 |
| 4 | | | | | (7) | 13.0 | | | | | (3) | 6.0[a] |
| 5 | | | | | (3) | 6.0 | | | | | | |
| 6 | | | | | (1) | 2.0[a] | | | | | | |
| 7 | | | | | | | | | | | | |

Table 15 Continued

| Number of Symptoms | Skin | | | | | | Musculoskeletal(MS) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Per System Based on Time Period | (3) | | (3) | | (7)[c] | | (4) | | (4) | | (4) | |
| Mean Number of Symptoms Per System Based on Time Period | .04 | | 1.09 | | 2.25 | | .13 | | .64 | | 1.68 | |

| | Lungs and Heart | | | | | | Gastrointestinal (GI) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | (53) | 100.0[a] | (33) | 62.0 | (46) | 87.0 | (50) | 94.0 | (25) | 47.0 | (11) | 21.0 |
| 1 | ---------- | | (20) | 38.0 | (7) | 13.0 | (3) | 6.0 | (11) | 21.0 | (7) | 13.0 |
| 2 | | | | | | | | | (8) | 15.0 | (9) | 17.0 |

Table 15 Continued

| Number of Symptoms | Lungs and Heart | | | | | | Gastrointestinal | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 3 | | | | | | | | | (4) | 7.0 | (7) | 13.0 |
| 4 | | | | | | | | | (3) | 6.0 | (10) | 19.0 |
| 5 | | | | | | | | | (0) | 0.0 | (5) | 9.0 |
| 6 | | | | | | | | | (2) | 4.0 | (4) | 8.0 |
| 7 | | | | | | | | | ----------[a] | | ----------[a] | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per System Based on Time Period | (1) | | (1) | | (1) | | (10) | | (10) | | (10) | |
| Mean Number of Symptoms Per System Based on Time Period | 0.0 | | .38 | | .60 | | .06 | | 1.19 | | 2.55 | |

Table 15 Continued

| Number of | Genitourinary (GU) | | | | | | Sexuality | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| 0 | (53) | 100.0[a] | (42) | 79.0 | (46) | 87.0 | N.A.[b] | | N.A.[b] | | (10) | 19.0 |
| 1 | ---------- | | (11) | 21.0 | (7) | 13.0 | | | | | (5) | 9.0 |
| 2 | | | | | | | | | | | (17) | 32.0 |
| 3 | | | | | | | | | | | (4) | 7.0 |
| 4 | | | | | | | | | | | (10) | 19.0 |
| 5 | | | | | | | | | | | (3) | 7.0 |
| 6 | | | | | | | | | | | (4) | 7.0 |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 | | | | | (53) | 100.0 |
| Total Number of Symptoms Possible Per System Based on Time Period | (1) | | (1) | | (1) | | | | | | (6) | |

Table 15 Continued

| Number of Symptoms | Genitourinary (GU) | | | | | | Sexuality | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % | (N) | % |
| Mean Number of Symptoms Per System Based on Time Period | 0.0 | | .21 | | .13 | | | | | | 2.45 | |

[a]This symbol signifies that no responses exceeded this number.

[b]This symbol signifies that these time periods did not apply in the sexuality system. This was because all of the items began with the phrase, "Since you returned from Vietnam_____", and subsequently were classified in the "after Vietnam" time period.

[c]Because all questions within the system began, "Since you returned from Vietnam_____" were counted as being in the "after Vietnam" time period, there is a difference in the total number of symptoms possible per time period.

Table 16

Number of Psychological Symptoms of Potential Agent Orange Exposure Reported in Relationship to Service in Vietnam

| Number of Symptoms | Psychological | | | | | |
|---|---|---|---|---|---|---|
| | Before Vietnam | | During Vietnam | | After Vietnam | |
| | (N) | % | (N) | % | (N) | % |
| 0 | (6) | 11.0 | (16) | 30.0 | (0) | 0.0 |
| 1 | (12) | 23.0 | (6) | 11.0 | (2) | 4.0 |
| 2 | (33) | 62.0 | (11) | 21.0 | (2) | 4.0 |
| 3 | (2) | 4.0[a] | (5) | 9.0 | (3) | 6.0 |
| 4 | ---------- | | (8) | 15.0 | (5) | 9.0 |
| 5 | | | (5) | 9.0 | (5) | 9.0 |
| 6 | | | (0) | 0.0 | (12) | 23.0 |
| 7 | | | (0) | 0.0 | (7) | 13.0 |
| 8 | | | (2) | 4.0[a] | (9) | 17.0 |
| 9 | | | ---------- | | (8) | 15.0[a] |
| 10 | | | | | ---------- | |
| Totals | (53) | 100.0 | (53) | 100.0 | (53) | 100.0 |
| Total Number of Symptoms Possible Per Time Period | (11) | | (11) | | (11) | |
| Mean Number of Symptoms Per Time Period | 1.59 | | 2.19 | | 6.13 | |

[a]This symbol signifies that no responses exceeded this number.

to the time period after Vietnam. This decrease in the percentage of reported number of zero symptoms over the same time periods was only 13% within the GU and lungs and heart system which only had n's of one. Perhaps because of the small n's, the latter two systems were singular for two additional reasons. The lungs and heart system was the only system in which 100% of the respondents claimed no symptom for the "before Vietnam" time period. Both the lungs and heart and the GU system were the only systems in which the mean number of reported potential Agent Orange exposure symptoms decreased between the "during Vietnam" time period to the "after Vietnam" time period.

The GI system is noteworthy, as seen in Table 15, because all of its respondents claimed zero or one symptoms for the "before Vietnam" time period. This number jumped to 0 to 6 symptoms for the "during Vietnam" period.

It should be noted that the data in the sexuality system are identical for Tables 11 and 15. This was because all of the sexuality items were considered potential Agent Orange exposure symptoms, whether they were physiological or psychological. As seen in Tables 11 and 15, just under two-thirds of the respondents accounted for 50% or more of the reported sexual difficulties.

The psychological symptoms of potential Agent Orange exposure are reported in Table 16. As evidenced previously (Table 12) by the total number of psychological symptoms reported, the reported psychological symptoms of potential Agent Orange exposure showed a steady increase from the "before Vietnam" to "after Vietnam" time

periods. This is readily apparent in Table 16 by observing the mean numbers of reported symptoms per time period. However, a surprising finding was that the percentage of respondents who reported no symptoms in the "before Vietnam" time period (11%) increased to 30% in the "during Vietnam" time period, and declined to zero in the "after Vietnam" time period.

Section Four

When the instrument was being developed, the investigator made two assumptions: a) most subjects would have visited some kind of health facility in the past three years, and b) the subject would have a better long-term memory for the types of health facilities used than for the type of health services obtained. As a primary care provider, the investigator has encountered the latter memory impairment when taking a health history. Often the individual can specify the type of doctor he saw and the type of health facility in which this encounter took place, but when pressed as to the type of health services he received (unless he had surgery), he can usually only specify his initial reason for seeking health care. This self-perceived symptom of dysfunction is known as the chief complaint. Although the presence of chief complaints may prompt a large number of health care visits, overall utilization of health care services is affected by many factors. This researcher proposed to examine several variables that may affect the level of health care use of the Vietnam veteran.

In response to Research question 3a:

What patterns of health care utilization are reported by the Vietnam veteran?

the health services and facilities used by the subjects are represented in Tables 17, 18 and 19. The health services listed in Table 17 were utilized by the 39 respondents who claimed a year or less as the interval since the last health care visit (Table 20). Respondents were requested to check as many types of services as had been used.

Health services are often described as having one of two orientations: disease-treatment or health-maintenance. A number of authorities in public health have expressed the belief that the health status of the general populace would be vastly upgraded if the nation's health care providers placed more emphasis on health-maintenance services. In this particular sample, illness/injury treatment services in inpatient (hospital) and outpatient (doctor's office or clinic) settings in the last year were utilized by 36% and 59% of the respondents respectively. An example of a health-maintenance service, utilized by 51% of the respondents, was routine physical/shots/check-up (Table 17). There may have been some confusion among respondents who selected the latter service, if they also designated an Agent Orange screening exam. Normally, any type of screening examination is considered a health-maintenance service. Since the number of respondents that checked "routine physical etc." (20) was similar to that of the respondents who checked "Agent Orange screening exam" (17), these numbers may represent the same individuals.

Table 17

Types of Health Services Utilized in the Past Year

(N=39)[a]

| Services | N | Percent |
|---|---|---|
| Routine physical/shots/check-up | 20 | 51.0 |
| Mental health care/psychiatric or psychological counseling (in or out of hospital) | 24 | 62.0 |
| Doctor's office or clinic treatment of physical illness or injury | 23 | 59.0 |
| Hospital treatment (including emergency room) of physical illness or injury | 14 | 36.0 |
| Drug or alcohol use treatment/counseling (in or out of hospital) | 10 | 26.0 |
| Dental exam | 17 | 44.0 |
| Eye exam | 5 | 13.0 |
| Agent Orange screening exam | 17 | 44.0 |
| Sexual counseling | 1 | 3.0 |
| Family planning advice (including fertility studies and genetic counseling) | 2 | 5.0 |
| Rehabilitation/physical therapy | 7 | 18.0 |
| Other[b] | 11 | 28.0 |

[a]The total number of respondents is based on the combined numbers of respondents who stated that the interval since their last health care visit was 12 months or less, as seen in Table 20.

[b]All respondents cited the Outreach Center.

Table 18

Types of VA Health Care Facilities Used In The Past Three Years

| Facilities | Number of Users |
|---|---|
| Hospital inpatient | 9 |
| Hospital outpatient | 23 |
| Hospital resident (psychiatric or nursing home care unit) | 1 |
| Day treatment for drug/alcohol abuse | 4 |
| Agent Orange screening exam | 17 |
| Other | 13[a] |

[a]Twelve respondents specified the Outreach Center. One respondent specified physical therapy.

Table 19

Types of Non-VA Health Care Facilities Used In The Past Three Years

| Facilities | Number of Users |
|---|---|
| Hospital inpatient | 4 |
| Hospital outpatient | 3 |
| Emergency room | 9 |
| Physician's office | 24 |
| General/family practitioner | 17 |
| Specialist | 6 |
| Psychiatrist | 12 |
| Other | 1[a] |

[a]The respondent specified social worker.

Table 20

Selected Characteristics Pertaining to Utilization of Health Care

(N=53)

| Sample | N | Percent |
|---|---|---|
| Self-rating of health status | | |
| Excellent | 2 | 4.0 |
| Good | 17 | 32.0 |
| Fair | 30 | 56.0 |
| Poor | 4 | 8.0 |
| Regular source of health care | | |
| Yes | 12 | 23.0 |
| No | 26 | 49.0 |
| Non-response | 15 | 28.0 |
| Interval since last health visit | | |
| 6 months or less | 32 | 60.0 |
| 7-12 months | 7 | 13.0 |
| 13-24 months | 3 | 6.0 |
| 25-36 months | 5 | 10.0 |
| 37 months or more | 6 | 11.0 |
| Use of VA facilities in last 3 years | | |
| On all visits | 17 | 33.0 |
| On some visits | 22 | 43.0 |
| On no visits | 10 | 16.0 |
| Not appropriate | 4[a] | 8.0 |

[a]This figure did not match the number of respondents who cited a 37-month or greater interval since the last health care visit, as seen above. The latter respondents were classified as "not appropriate" because they would not have used VA facilities in the last three years.

Four additional services displayed in Table 17 that can be considered health-maintenance oriented are: dental and eye exams, family planning advice, and mental health care. However, it should be kept in mind in interpreting the data that the services mentioned above can also be sought for disease-treatment. Without information about the respondent's chief complaint when he utilized these services, there is no way of classifying them as disease-treatment or health-maintenance.

Many Vietnam veterans have demonstrated reluctance to use VA facilities. This investigator attempted to distinguish between the regular VA-user, the occasional VA-user, and the VA-nonuser (Table 20). The respondents were then asked to identify the VA and non-VA facilities that they had used in the past three years. There may have been some confusion at this point because the written instructions (Appendix C) were contradicted by arrow misplacement; the written instructions directed only respondents who were non-VA users to the column of non-VA facilities but the arrows directed the occasional VA-user to the non-VA facility column as well. The result of this contradiction was that the occasional VA-user ("on some visit" respondents--Table 20) checked both the VA and the non-VA facilities which he had used in the past three years (Tables 18 and 19). Forty-nine respondents were included of whom two respondents had claimed a 37 month or more interval since the last health care visit (Table 20).

The most widely used VA facility, with 23 users, was the hospital outpatient service (Table 18). An interesting feature of these

data was that 13 respondents marked "Other" and then specified the Outreach Vet Center as the health facility that they had used. The VA does not consider the Outreach Vet Centers to be medical treatment facilities.

As seen in Table 19, the most popular non-VA health facility for this sample, with 24 users, was a physician's office. Of those 24 respondents, 17 saw general or family practitioners.

As illustrated in Table 20, several additional factors were explored which may have affected the Vietnam veteran's health care use, which responded to Research question 3b:

> What factors may be important in determining the veteran's pattern of health care use?

When examining any individual's pattern of health care utilization, attention must be paid to his financial condition in general, and his insurance coverage, specifically. This variable is particularly salient because researchers have stated that adequate private health insurance coverage is one of the chief reasons cited by veterans for avoiding VA facilities.

The following material has not been presented in tabular form. This sample was split in half according to presence and absence of VA disability classifications; 27 respondents stated that they had a disability classification with the VA (79% of which had a 0-30% disability rating) and 26 respondents stated that they did not. Thirty-one respondents (60%) claimed some form of private insurance, while 22 respondents (40%) denied private insurance coverage. Of the latter group, only two respondents stated that they

were receiving public assistance, i.e., Medicaid, Medicare.

As illustrated in Table 20, over half of the respondents rated personal health status as fair. Only 23% of the sample claimed a regular source of health care. However, it should be noted that 28% of the sample did not respond to the latter item.

As seen in Table 20, the majority of respondents (73%) had sought health care in the last year. Only six respondents (11%) had allowed an interval of 37 months or more to elapse since the last health care visit.

The largest percentage of respondents (43%) had utilized a combination of VA and private facilities for health care in the last three years; they were classified as occasional VA-users. A relatively small percentage (10%) had not used the VA at all for health care in the last three years. These respondents were asked to state the reasons for their VA-avoidance. Their responses could be summarized into four main reasons: a) overall lack of trust, b) belief that VA personnel have negative attitudes toward Vietnam veterans, c) not indigent, and d) ineligible for care.

Section Five

The final section of findings addressed the relationships between a number of new variables. Before discussing those relationships, it is necessary to illustrate how the variables were created.

The two new functionally independent variables were known as total number of symptoms reported and total number of potential Agent Orange exposure symptoms reported. Both variables were

a product of the addition of all the positive responses in the "after Vietnam" time period only. Each "total" variable was then divided into total physiological symptoms reported and total psychological symptoms reported (Table 21). These subcategories of symptoms were utilized in making correlations between variables.

The means of the total number of symptoms reported and the total number of potential Agent Orange symptoms reported were not statistically compared due to the differences in sample sizes. It should be noted, however, that a difference of approximately one-third was evident between the means after adjusting for the differences in sample size.

Three of the functionally dependent variables used in the correlation have been discussed--interval since last health care visit; self-rating of health, combat status, and potential level of Agent Orange exposure of military station. One additional functionally dependent variable was created for use in the correlation. It is called Agent Orange knowledge/beliefs. The responses to questions 1, 2, 2a and 3 in section IV of the questionnaire (Appendix C and summarized in Table 22) were combined into a total score of knowledge/beliefs about Agent Orange. Possible scores ranged from 0 to 8. The following coding was used for "Yes-No" questions:

Yes = 2

Don't Know = 1

No = 0

Missing Data = 0

Table 21

Comparison of Types of Symptoms Reported In The Post-Vietnam Period

(N=53)

| Symptoms | Total Symptoms Possible | Range | Mean |
|---|---|---|---|
| Total Number of Symptoms Reported | 151 | 34-93 | 57.26 |
| Physiological | 116 | 26-77 | 31.23 |
| Psychological | 35 | 4-18 | 12.24 |
| Total Number of Potential Agent Orange Exposure Symptoms Reported | 54 | 15-46 | 31.23 |
| Physiological | 43 | 14-37 | 23.21 |
| Psychological | 11 | 1-9 | 6.13 |

Table 22

Summary of Descriptive Characteristics on Agent Orange Knowledge/Beliefs

| Sample | N | Percent |
|---|---|---|
| Heard about Agent Orange | | |
| Yes | 49 | 92.0 |
| No | 4 | 8.0 |
| Believed personal exposure to Agent Orange | | |
| Yes | 30 | 56.0 |
| No | 1 | 2.0 |
| Don't know | 20 | 38.0 |
| Not appropriate | 2[a] | 4.0 |
| Able to specify exposure location | 27 | 90.0[b] |
| Believed that present symptoms/ illnesses resulted from self-exposure to Agent Orange | | |
| Yes | 8 | 15.0 |
| No | 0 | 0.0 |
| Don't know | 27 | 51.0 |
| Not appropriate | 18[c] | 34.0 |

[a]This figure did not reflect the total number of respondents who were instructed to skip each question. The item on personal exposure belief should have had 4 missing answers to match the 4 respondents who answered "No" to the first question above.

[b]This percentage was based on N = 30, i.e., the respondents who stated belief in personal exposure to Agent Orange in the previous question.

[c]The item on symptom belief should have had 23 missing answers to match the number of respondents who did not answer "Yes" to the personal exposure question.

Additionally, if the "exposure location" item was answered at all, the response was coded as a 2. This method of coding is translated into Agent Orange knowledge/beliefs as follows:

0 = had not heard about Agent Orange;

1 = had not heard about Agent Orange, did not know if exposed to it (This score should not have been possible because any respondent who had not heard of Agent Orange was instructed by a contingency question to skip the item about personal exposure belief; two of the four respondents who had not heard about Agent Orange did not follow the directions);

2 = had heard about Agent Orange but did not believe that he had been exposed to it;

3 = had heard about Agent Orange but did not know if he had been exposed to it.

4 = had heard about Agent Orange, believed he was exposed to it (This score could have included the previous two components plus the response that he did not believe that he had present symptoms/illnesses that resulted from exposure; no subjects made the latter response);

5 = had heard about Agent Orange, believed he was exposed to it, did not know if he had present symptoms/illnesses that were a result of exposure;

6 = had heard about Agent Orange, believed that he was exposed to it, specified location of exposure, did

not respond to an item on present symptoms/illnesses OR had heard about Agent Orange, believed he was exposed to it, could not specify exposure location, believed he had present symptoms/illnesses that resulted from exposure to Agent Orange;

7 = had heard about Agent Orange, believed that he was exposed to it, specified exposure location, did not know if he had present symptoms/illnesses that resulted from exposure, and

8 = had heard about Agent Orange, believed he was exposed to it, specified exposure location, and believed that he had present symptoms/illnesses that resulted from exposure.

The major limitation of this scale may pertain to its lack of internal consistency. It could be argued that knowledge of Agent Orange should not be included in a scale that predominantly measures Agent Orange beliefs. Another method might have used the responses of the four subjects who had not heard about Agent Orange to construct a separate no-knowledge variable. However, since the scale was constructed of responses that had already been made, i.e., ex post facto, some measure of reliability and validity was assumed.

In the examination of the findings in Table 22, it can be seen that nearly all (92%) of the respondents had heard about Agent Orange. Thirty respondents (56%) believed that they had been

exposed to Agent Orange, and 90% of this group were able to specify where the exposure took place. Although 15% of the sample believed that they presently had symptoms/illnesses that were a result of exposure, the majority (51%) did not know if they had present symptoms/illnesses. It should be added that all but one of the respondents who believed that he had present symptoms/illnesses of exposure were able to specify those symptoms. These included: chronic liver dysfunction, back and prostate problems, persistent rash, pulmonary problems, gastric disorders, nervousness and depression.

The scale illustrated in Table 23 is useful in outlining the characteristics of the sample regarding Agent Orange knowledge and beliefs. The largest group of respondents (38%) scored 7 on the scale, indicating that they had heard about Agent Orange, believed they had been exposed to Agent Orange, specified the exposure location but did not know if present symptoms/illnesses resulted from Agent Orange exposure. The other large percentage (25%) scored 3. This indicated that those respondents knew about Agent Orange but they did not know if they had been exposed to it. The mean score (Table 23) which was 5.19, represented individuals who knew about Agent Orange, believed that they had been exposed to it but did not know if they had present symptoms/illnesses that resulted from exposure.

Kendall's rank order correlation coefficient, commonly known as Kendall's tau, is a symmetrical proportional measure of association. Its specific label is reduction in error measure. Most

Table 23

Total Scores for Agent Orange Knowledge/Beliefs Scale

| Scores | N | Percent |
|---|---|---|
| 0 | 2 | 4.0 |
| 1 | 2 | 4.0 |
| 2 | 1 | 2.0 |
| 3 | 13 | 25.0 |
| 4 | 5 | 9.0 |
| 5 | 2 | 4.0 |
| 6 | 1 | 2.0 |
| 7 | 20 | 38.0 |
| 8 | 7 | 12.0 |
| Total | 53 | 100.0 |
| Mean Score | 5.19 | |

useful when dealing with large numbers of tied pairs, it is a measure of how well the relative order of pairs of observations may be predicted. Kendall's tau is a more conservative measure of ordinal association than Spearman's rank order correlation coefficient. Since this study was exploratory in nature, attempting to prove causation between variables, as with an asymmetrical measure, was not appropriate. A symmetrical measure examines the degree to which the variation of each of two variables tends to coincide without regard to causation.

In response to Research Question 4a,

> Is there a relationship between the total number of post-Vietnam symptoms/illnesses reported and exposure to combat?

the total number of post-Vietnam symptoms reported was found to have no correlation with combat status (Table 24). For all of the correlation coefficients, significance was established at the $p < .05$ level. The response to Research Question 4b,

> Is there a relationship between the total number of post-Vietnam symptoms/illnesses reported and the interval since the individual's last health visit?

is illustrated in Table 24. No significant correlation was found. Responding to Research Question 4c,

> Is there a relationship between the total number of post-Vietnam symptoms/illnesses reported and self-rating of health?

there was no relationship of significance between these variables. In response to Research Question 4d,

> Is there a relationship bewteen the total number of post-Vietnam potential Agent Orange exposure

Table 24

Intercorrelations of Selected Study Variables (Kendall Tau Values)

| | Combat | Interval Since Last Health Care Visit | Self-Rating of Health | Agent Orange Knowledge/ Beliefs Scale Score | Level of Potential Agent Orange Exposure of Military Station |
|---|---|---|---|---|---|
| Total Number of Post-Vietnam Symptoms Reported | -.05* (N.S) | -.11* (N.S.) | -.001* (N.S.) | --------- | --------- |
| Total Number of Post-Vietnam Potential Agent Orange Exposure Symptoms Reported | ---------- | ---------- | ---------- | -.02* (N.S.) | -.14* (N.S.) |

*Not significant at the .05 level

> symptoms/illnesses reported and the individual's knowledge and beliefs about Agent Orange?

there was no correlation found between the total number of potential Agent Orange exposure symptoms reported and a veteran's score on the Agent Orange knowledge/beliefs scale. Likewise in answer to Research Question 4e,

> Is there a relationship between the total number of post-Vietnam potential Agent Orange exposure symptoms/illnesses and the level of potential Agent Orange exposure of the individual's station(s) in Vietnam?

no significant relationship was reported between total number of post-Vietnam potential Agent Orange exposure symptoms and the potential level of Agent Orange exposure of an individual's military station.

## Discussion

Although the sampling method was not random, there were a number of descriptive characteristics present in the sample to indicate the degree to which it represented the population of Vietnam veterans. Since 83% of the respondents were between 25 and 35 years of age, this indicated that they had returned from Vietnam between six and fifteen years ago, which was the same time range since discharge noted by Egendorf et al. (1981) in large-scale research of postwar adjustment of the Vietnam veteran. Although White respondents predominated (83%) in the sample, resulting in under-representation of the other ethnic groups who were involved in the Vietnam War, it is suggested that these respondents were typical of the Utah Vietnam veteran. This may also hold true for the demographic

characteristics, marital status and religious preference. The last characteristic showed the anticipated substantial percentage (33%) of respondents of the Latter-Day Saints faith. (No attempt was made to correlate this variable with others.) Despite early fears that respondents who patronize the Outreach Vet Center and/or rap groups would tend to be indigent, the majority of subjects (56%) reported an annual income of $12,000 to $30,000.

Most of the respondents (55%) were combat veterans. The classification method was based on subjective judgments. Although the most accurate classification was probably that of combat, the remaining two categories, rear and combat and/or rear, may very well have included some combat veterans. Even if all of the respondents who were classified as combat and/or rear (15%) were counted as combat veterans, there still would be 9% of the respondents who reported being wounded in Vietnam that were classified as rear. Of course, those respondents may have sustained injuries that were not combat-related, or amid the uncertainty of a war fought without battlelines, they may have been hit by the enemy while in rear positions. This illustration of the dilemma of combat classification highlights a central issue for Vietnam War researchers: How does one differentiate between the stress of an individual in daily hand-to-hand combat with the enemy and the stress of an individual in a support unit who never knows when the next shell or booby trap might be uncovered?

In the perusal of the total number of reported physiological symptoms, it can be discovered that there was very little

variation between the systems. Except for the GI system, the average range of reported symptoms per system was 3 to 6, suggesting that each system of the body possessed an equal chance of becoming an impetus to seek health care. The large percentages of respondents reporting no symptoms that were found in the GU and sexuality systems may in part be attributable to a generalized reluctance to disclose genital difficulties.

Interestingly, the GI system respondents reported the highest mean number (8.81) of symptoms (without adjustment for system sample size). The GI system has been considered by many researchers the prototype of the system that manifests psychological stress in a physiologic way. Egendorf et al. (1981) included the item "stomach troubles" in the construction of their Vietnam veteran stress scale. In view of the data for total number of reported psychological symptoms, which showed the mean number of reported psychological symptoms was 13.43 out of a sample size of 35, it could be suggested that the psychological health status was a determinant of the type of physiological symptoms reported.

In further examination of the total number of psychological symptoms reported, it should be noted that respondents reported no fewer than 4 symptoms, and that 78% of the sample reported 11 to 16 symptoms in the "after Vietnam" time period. These findings were considerably higher than the findings of Kadushin, Boulanger and Martin (1981) who found an average of 3 to 5 symptoms reported as having occurred in the previous year in a sample of Vietnam veterans.

However, the latter researchers also found that there were significantly fewer symptoms reported by veterans who had left Vietnam 11 or more years ago than those who had left six to ten years ago. This finding could explain the high number of psychological symptoms reported in this study since the majority of respondents (83%) served in Vietnam from 1968 - 1971 and in all likelihood left Vietnam less than 11 years ago. Kadushin et al.'s (1981) 21-item stress scale contained 15 psychological symptoms and 3 physiological symptoms that were identical with symptoms utilized in this research (although this investigator did not construct a stress scale of symptoms). Kadushin et al. (1981) classified men who first manifested five or more symptoms (on the stress scale) in the "during Vietnam" time period or up to one year thereafter as having experienced a stress reaction. Applying the former criteria to the present work, it can be seen by examining the total number of psychological symptoms reported for each of the three time periods (before, during and after Vietnam) that many of the respondents may be considered to have experienced a stress reaction. This is evidenced by a jump in mean number of reported symptoms from .21 to 4.26 between the "before Vietnam" and "during Vietnam" time periods. Although information was not solicited about the immediate post-Vietnam period, an additional increase was noted from the "during Vietnam" to the "after Vietnam" time period (4.26 to 12.25). These findings suggest that this sample may have included a larger representation of psychologically stressed individuals than a random sample may have contained. This conclusion can be supported

by the data for the overall percentage of respondents who reported either inpatient or outpatient psychiatric treatment (55%). However, this conclusion must be modified by the possibility that the respondents in this non-random sample, by virtue of the fact that the majority had sought psychological readjustment assistance from the Outreach Vet Center, may have had an overall negative attitude toward Vietnam War experiences, perceiving them as the beginning of all life problems, irrespective of their effect on psychological and physiological health.

The pattern of increasing reported symptoms manifested in the psychological system was also evidenced in the reported symptoms of the physiological systems. The greater magnitude of increase in most systems was demonstrated, by far, from the "before Vietnam" to the "during Vietnam" time period than from the "during Vietnam" time period to the "after Vietnam" time period.

There may be a number of explanations for the phenomena. Since as many as 17 years have elapsed since the respondent went to Vietnam initially, the respondent may have had limited recall of his pre-Vietnam health status. Another age-related limitation was that the initial occurrence of symptoms of somatic dysfunction is not uncommon among a sample of American men in the third to fourth decades. This explanation may be especially pertinent to the increases in reported symptoms in the lungs and heart and MS systems.

However, this would not explain the larger increase in reported symptoms between the first two time periods. Perhaps the latter increase was related to injuries sustained by respondents (79%) in

Vietnam, although it is somewhat implausible that any war-related injury could cause the overall increase in reported symptoms that was consistently observed across the systems. Again, as mentioned above, the report of physiological symptoms may have increased for the "during Vietnam" time period because the respondents believed that their health was jeopardized by the war, perhaps from a combination of psychological stress, combat injuries, and exposure to Agent Orange. Indeed, given the similar increases in the total number of symptoms reported and the number of potential Agent Orange exposure symptoms reported over the three time periods, there may be a case made that the sample was homogenous for certain types of health problems.

In the examination of the reported physiological symptoms of Agent Orange exposure, it should be noted that every system but the GI system contained respondents who reported all of the symptoms possible. This observation may not be significant from the standpoint that several systems contained only one symptom (MNT, lungs and heart, and GU) and the potential Agent Orange exposure symptoms were nonspecific in many ways, i.e., unless they were present in patterns, they may not have suggested potential exposure.

The GI system, which had the highest number of total reported symptoms, had a relatively large mean number of post-Vietnam potential Agent Orange exposure symptoms reported (2.55). This phenomenon might suggest that the actual effects of Agent Orange exposure appear predominantly in the GI system in this sample, or it may support the notion that psychological stress (as seen through

numbers of psychological symptoms reported) is associated with GI symptoms.

The largest mean number of potential Agent Orange exposure symptoms (3.06) was found in the eyes and ears system. Although the latter system's total number of potential Agent Orange exposure symptoms (7) was nearly as large as the GI system's (10), the relationship of the eyes and ears symptoms to potential Agent Orange exposure has not been as greatly emphasized in the literature in the past as the relationship of GI symptoms to potential exposure. Therefore,this finding may lend support to the conclusion that no pattern existed among the reported symptoms of potential Agent Orange exposure. However, in view of the fact that 56% of the respondents rated their health as only fair and 56% were classified as having served in an area of potentially heavy Agent Orange exposure, it would seem appropriate to investigate, on an individual basis, the pattern of self-reported symptoms.

In relationship to the three time periods, the number of physiological potential Agent Orange exposure symptoms reported increased even more dramatically than the total number of physiological symptoms reported. This, in part, was because the small system sample sizes of the MNT, lungs and heart, and GU systems (2,1 and 1 respectively) resulted in the appearance of large shifts in the percentage of respondents who reported no symptoms from the "before Vietnam" time periods to the remaining time periods.

Although the change in the reported small-sample systems' symptoms over the time periods accounted for a large degree of the

overall increases between the "before Vietnam" and "during Vietnam" time period, three additional systems (brain, eyes and ears, and skin) manifested this phenomenon. Because Agent Orange has been more often associated with chronic rather than acute effects in the body, it seems unlikely that the symptoms reported in the above systems were evidence of potential exposure, at least in the "during Vietnam" period. The reported potential Agent Orange exposure symptoms within the brain, eyes and ears, and skin systems may have accidentally coincided with the combat-related symptoms for the "during Vietnam" time period.

It should be noted that all of the symptoms in the sexuality system were potential Agent Orange exposure symptoms. Two-thirds of the respondents reported more than 50% of the symptoms. This figure suggested that there could be a pattern of potential Agent Orange exposure symptoms present in this system. However, in view of the overall number of psychological symptoms reported, this would be a tenuous conclusion, since researchers have found that psychological health problems are often associated with (if not accompanied by) sexual difficulties.

There was a high incidence of the psychological symptoms of potential Agent Orange exposure reported. This was not unexpected since the latter symptoms form a subset of the symptoms of depression and/or posttraumatic stress disorder. Seventy percent of the sample reported between 6 and 9 symptoms out of a total system sample of 11, with no respondents reporting zero symptoms. This finding was similar to the finding of the total number of

psychological symptoms reported, except that respondents reported as few as one psychological symptom of potential Agent Orange exposure as compared to four overall psychological symptoms reported. This contrast would seem to support the notion that the symptoms of depression and posttraumatic stress disorder represented separate clinical entities which, when added, may produce an exaggerated picture of the overall psychological symptoms in the Vietnam veteran. The latter would then furnish an alternate explanation for the large number of reported psychological symptoms.

An unusual pattern was found in the psychological potential Agent Orange exposure symptoms in relationship to the three time periods. Although the mean number of reported psychological symptoms increased from the "before Vietnam" time period to the "during Vietnam" time period as well as from the "during Vietnam" time period to the "after Vietnam" time period, the percentage of respondents who reported no psychological symptoms of potential Agent Orange exposure <u>increased</u> from the "before Vietnam" to the "during Vietnam" time period. This finding might be interpreted as support for Bourne's (1970) allegation that the psychiatric casualty rate during the Vietnam War was low in comparison to previous wars. However, the fact that there were no respondents who reported zero psychological symptoms of potential Agent Orange exposure for the "after Vietnam" period suggested that the belief held by many researchers, i.e., the psychological casualties of the Vietnam War became manifest after Vietnam because they represented a different breed of psychological symptoms, may be more accurate.

In the discussion of health care utilization, several surprising findings should be noted. Since most of the research of health care utilization patterns of Vietnam veterans indicated that they were reluctant to seek health care, even when they had symptoms of ill health, it was not expected that 39 of the sample respondents would have reported seeking health care in the past year. This might have been understandable if all of those health care visits had been for treatment of an illness or injury. However, this type of health service only accounted for 60% of the doctor's office treatments and 36% of the hospital treatments (an additional 26% received drug/alcohol use treatment or counseling which is considered by some to be a disease-treatment service.)

The remainder of the services utilized in the past year were of the health-maintenance type. However, the particular phrasing of the services (Table 17, p. 112) such as the frequent use of the word "exam", was subject to individual interpretation. Therefore, items such as "dental exam" and "eye exam" may have been illness-treatment in nature. The sole service that did not contain that ambiguity was "routine physical/shots/check-up." However, those respondents who designated "Agent Orange screening exam" may have been confused by the separate categories, since screening exams are routinely regarded as health maintenance-oriented, similar in nature to routine physicals. This was believed because the number of respondents for each health service was comparable, 20 respondents for "routine physical etc." and 17 respondents for "Agent Orange screening exam." If indeed these figures represented different

respondents who sought health-maintenance services within the past year, the combined percentage would be 95%. If this were the case, there must have been a reason that so many individuals of this age group in this sample would have sought health appraisal. Because the question of Agent Orange exposure has often been publicly raised, especially within the last year, for thousands of Vietnam veterans, the element of fear could have served as a stimulus for Vietnam veterans to seek health care. A newspaper article (Associated Press, 1981) recently reported that the VA estimates that 60,000 veterans have received self-initiated screening examinations for Agent Orange exposure. Some researchers have expressed the belief that most of the individuals who seek Agent Orange screening exams (44% of a sample of 39 in this study) have already formulated beliefs that they have been exposed to Agent Orange and are, subsequently, looking for official confirmation.

The latter belief may be substantiated by the scores of the majority of respondents on the Agent Orange knowledge/beliefs scale. The largest percentage (38%) of respondents scored 7 on the scale which represented the following: they had heard about Agent Orange; they believed that they had been exposed to it; they specified the location of the exposure in Vietnam; but they did not know if they presently had symptoms/illnesses that resulted from Agent Orange exposure. This percentage was close to the percentage (44%) of respondents who reported an Agent Orange screening exam in the past year. An intervening variable was the amount of Agent Orange information available to the individual veteran at the

Outreach Vet Center. Therefore, both the knowledge/beliefs on Agent Orange and the Agent Orange screening exam may have directly resulted from education at the Outreach Vet Center.

A final observation should be made concerning the health services reported. The highest percentage of respondents (62%) reported using a mental health care facility in the past year. This percentage represented 24 respondents, the number of which corresponded closely to the combined number of respondents who reported inpatient and outpatient psychiatric treatment (Table 17, p. 112). The implications of this finding tend to generate questions rather than conclusions. If the half of the sample who had sought psychiatric or mental health care had done so only in the past year, did this mean that the individuals had just recognized that they had a long-standing psychological problem with which they needed help? Or did the individuals who sought mental health care begin to experience psychological symptoms for the first time in the past year? If the latter was the case, would this have been considered a potential delayed stress reaction to the Vietnam War? A further question was formulated: Were the individuals who sought mental health care in the past year the same individuals who reported from 11 to 16 symptoms of psychological illness, or were the former the individuals who reported a lower number of psychological symptoms as a result of mental health care visits? The answers to these questions may be crucial for the provision of adequate mental health care facilities for the Vietnam veteran in the community.

In reviewing other facets of health care utilization, it was

encouraging to note that, at least in this sample, veterans had not turned away from VA facilities. Out of 49 respondents, 33% reported using the VA on all health care visits in the past three years. Only 16% of the respondents had not used the VA in the previous three years. The largest percentage of respondents (43%) was the occasional VA user. The number of occasional VA users (22) corresponded closely with the number of respondents who stated a VA disability classification (27). However, since 79% of the respondents who claimed a VA disability had only a 0-30% classification, it followed that those respondents may have been forced to mix health facility use, VA with non-VA. The individual would then have gone to the VA for disability-related services, and to non-VA facilities for other health services. This conclusion was supported by the relatively large number of respondents (23) who used VA outpatient services. It must be remembered that veterans with nonservice-connected symptoms/illnesses are not entitled to outpatient services at the VA. Perhaps, the users of VA outpatient services, when ineligible for the latter, made up the major part of respondents who used private physicians.

The number of respondents (13) who cited the Vet Outreach Center as a health facility they had used in the past three years may have been significant. Presuming that those respondents regarded the Outreach Center as a mental health resource, this would add another dimension to the aforementioned question: Who has been receiving mental health care?

The reasons cited by non-VA user respondents for not seeking

VA health care correspond with the findings of other researchers (Hammond, 1980; Lifton, 1973). They included: ineligibility, lack of trust/negative feelings toward the VA staff (because the latter displayed a negative attitude toward the Vietnam veteran), and no indigency status, which was not to say that a respondent reported adequate private health insurance. However, it was suggested by responses to health insurance items that all of the subjects were covered in some way. For example, 26 respondents reported no disability classification with the VA, which would thereby make them ineligible for VA care unless they were indigent or over 65. Since none of the sample's respondents were elderly, that meant that those 26 respondents either carried private health insurance and used non-VA facilities, claimed indigency to use VA facilities, or paid for VA services (which seemed an unlikely possibility). The discrepancy between the numbers of respondents with no reported VA disability (26) and the number of non-VA users (10) was puzzling. Despite the assumption that all of the respondents who had no VA disability classification were covered by private health insurance (31 respondents reported private health insurance), there still was no explanation as to how the no-disability respondents qualified for occasional VA health care (taking into account that four respondents had not answered the question). The implied conclusion was that some individuals had no form of health insurance, including public assistance (only two individuals reported coverage by public assistance).

The central issue of the discussion of VA versus non-VA health

utilization among Vietnam veterans was whether an individual had a regular source of health care. The poor response to this item (28%) may have been indicative of confusion concerning what constituted a regular source of health care. Often, this phrase has been interpreted as meaning family physician. Irrespective of missing data, very few respondents (12) reported a regular source of health care.

The final topic for discussion concerns the relationships of selected variables. None of the measures of association proved to have been significant. The sample was small and the statistic (Kendall's tau) was somewhat conservative. The most likely cause of the variables' lack of association was that the relationships that existed between the variables were not linear. The total number of symptoms reported may have increased with increasing combat status up to a point, beyond which no further increase in total symptoms was observed.

Another factor that may have accounted for lack of correlation between variables was the fact that combat and potential level of Agent Orange exposure of military station were variables that were created from existent responses. When this is done, the researcher runs the risk of dividing the answers of a homogenous sample into subcategories, between which there is little real difference. Although the subjective method of defining the above two variables may have accurately represented the respondents at the high end of the scale, there may have been considerable variation in the degree to which the remaining two classifications (within each variable)

represented the middle and low scores of a three-point scale. In the case of combat, this conclusion supported the statement by Egendorf et al. (1981) that, the more detailed the construction of a combat scale, the more likely one is to observe associations between combat and other variables.

The variables "interval since last health care visit" and "self-rating of health" were inconsistent on the basis of time comparison; one term related to present characteristics (self-rating of health) and the other term related to past health utilization behavior. One might have expected that a better correlation would have existed between self-rating of health and total number of reported post-Vietnam symptoms, since both related to the present. However, this relationship was not significant. A possible explanation for this was that the categories (excellent, good, fair, poor) had not represented discrete differences on an ordinal scale.

The score on the Agent Orange beliefs/knowledge scale was not found to have a significant relationship to the total number of reported symptoms of potential Agent Orange exposure. It had been expected that respondents who had a greater degree of knowledge/beliefs on Agent Orange would report a greater number of potential Agent Orange exposure symptoms. This may not have been found because the gradations on the scale were not representative of an adequate amount of difference between the respondents. Also, the number of symptoms reported may have increased to a point with more individual beliefs on Agent Orange and then leveled off. However,

it should be noted that, since most respondents scored either 3 or 7, this might have suggested that the total number of reported potential Agent Orange exposure symptoms was in reality not affected by an individual's knowledge and beliefs about Agent Orange.

Two additional aspects of the lack of association between total number of reported Agent Orange exposure symptoms and potential level of Agent Orange exposure of military station are discussed briefly. First, since the scientific community has not agreed on what constituted Agent Orange exposure among Vietnam veterans, it is possible that a particular individual's likelihood of manifesting symptoms of exposure may have been unrelated to his level of exposure to Agent Orange. His symptoms may be a result of predisposing health factors, such as medical history or genetic composition. If this were the case, individuals who were heavily exposed to Agent Orange may have developed fewer symptoms of exposure than those with minimal exposure to Agent Orange.

Secondly, it needs to be emphasized that a respondent's degree of potential Agent Orange exposure was inferred from his reported military station, whose level of potential exposure, in turn, was extrapolated from a map of Vietnam that represented Agent Orange missions. Although 46% of the respondents were classified as having been stationed in a location of heavy Agent Orange exposure, this classification was a product of two researchers' subjective conclusions. In reality, an individual may have been stationed in the center of an area of heavy Agent Orange spraying without ever having been sprayed. However, this raises a question similar to the one

posed previously: How could an individual who consumed Agent Orange-contaminated food and water on a daily basis be considered "not exposed" to Agent Orange on the basis of the fact that he had no direct skin contact with the herbicide?

It is clear that the overall complexity of the Agent Orange exposure issue may have been the chief reason for the nonsignificant association between the total number of reported Agent Orange exposure symptoms and the potential level of Agent Orange exposure of military station.

# CHAPTER V

# SUMMARY, RECOMMENDATIONS, AND IMPLICATIONS FOR NURSING

## Summary

Fifty-three Vietnam veterans in three Northern Utah cities served as a convenience sample for an exploratory study of the physiological and psychological health status and patterns of health care utilization of the Vietnam veteran. A self-report tool was used to measure the physiological and psychological symptomatology/illnesses in relationship to three time periods--before, during and after Vietnam. The total number of reported physiological and psychological symptoms/illnesses was then compared to a number of designated symptoms/illnesses that have been associated with exposure to the herbicide Agent Orange that was sprayed in Vietnam for defensive purposes from 1965 to 1970.

The sample was found to be representative of the White, middle-class male population found in Utah in terms of marital status and religious preference, i.e. married and of the Latter Day Saints faith. A large percentage of the sample were combat veterans who had served in Vietnam during the years 1968 to 1971 in areas that had received potentially heavy exposure to Agent Orange spraying

(based on number of spraying missions).

The reports of the total number of physiological and psychological symptomatology/illnesses present in the sample in relationship to the before, during and after Vietnam time periods responded to Research Questions 1a and 1b:

> What types of physiological and psychological illnesses and symptomatology are reported by the Vietnam veteran and how do these reported illnesses and symptomatology occur during the time periods before, during and after Vietnam?

The average number of physiological symptoms/illnesses reported ranged from 3 to 6 within all but one physiological body system. The physiological symptoms/illnesses were arranged according to the body systems: brain; eyes and ears; mouth, nose and throat (MNT); skin, lungs, and heart; musculoskeletal (MS); gastrointestinal (GI); genitourinary (GU); and sexuality. The largest mean number of symptoms/illnesses was reported within the GI system. Because a large number of psychological symptoms were also reported by the respondents, it was considered possible that the physiological symptoms of the GI system were a somatic expression of the individual's psychological symptoms.

The large mean number of psychological symptoms reported indicated that a significant number of respondents were experiencing symptoms of depression and/or posttraumatic stress disorder. This conclusion was based on the fact that all of the psychological symptom survey items were taken from the American Psychiatric Association's (1980) diagnostic criteria for the disorders. This finding was believed to be related to a number of factors. Because

the sample was drawn from the clientele of the Salt Lake City Outreach Vet Center (although not all subjects were obtained in Salt Lake City), the subjects may have represented a sample of Vietnam veterans who were already experiencing extensive psychological problems at the time that they were in contact with the Vet Center personnel. Although the Outreach Vet Center is not a mental health care facility, it does provide assistance to Vietnam veterans with psychosocial adjustment problems, which are closely related to the level of psychological well-being in an individual. Another factor that may have contributed to the large number of psychological symptoms reported was the attitude prevalent among many Vietnam veterans who patronized the Vet Center that the war was responsible for irrevocable negative changes in their lives. These changes were often perceived by the veteran in his psychological health status. The latter explanation would also account for the dramatic rise in psychological symptoms that was reported from the "before Vietnam" to the "during Vietnam" time period to the "after Vietnam" time periods.

The large number of psychological symptoms reported could have been related to preexisting mental illness, as 55% of the respondents reported having sought inpatient or outpatient psychiatric care post-Vietnam. A final possible explanation for the high incidence of reported psychological symptoms was that the latter was related to the time period in which the veteran served in Vietnam (post-1968 for 83% of the respondents) and the time that had elapsed since he returned from Vietnam. Some researchers have

speculated that the dramatic changes that occurred in the war during 1968, both in Vietnam and in the United States, produced greater stress in the veterans who served in that time period that in those who were in Vietnam prior to 1968. Additionally, some researchers have uncovered a pattern of decreasing symptoms of posttraumatic stress disorder in veterans who served in the pre-1968 period, and therefore, have been back in the United States for a greater number of years.

The total number of reported physiological and psychological symptomatology/illnesses within each body system was found to increase consistently from the "before Vietnam" time period to the "during Vietnam" time period and from the "during Vietnam" time period to the "after Vietnam" time period. The majority of systems demonstrated the greatest degree of increase in reported symptoms/illnesses between the former two time periods. Other than the obvious explanations of limited long-term memory and expected increases in pathology with advancing age, there may be other explanations of this phenomenon. The increase in reported physiological symptoms/illnesses between the "before Vietnam" and the "during Vietnam" time periods may have resulted from wounds sustained in Vietnam, as 79% of the sample respondents reported being wounded while there. However, even multiple-system injuries would not necessarily cause an increase in symptoms/illnesses in all body systems between those time periods. There may have been some component of explanation in the speculation that an individual might hold the belief that the war inalterably changed his physiological

health state. Finally, the findings may have been influenced by the Hawthorne effect, in that subjects presented with three time periods for classifying a given symptom suspected that the study wished to discover an increase in symptoms over the time periods and subsequently answered in that way to please the researcher.

In response to Research Questions 2a and 2b,

> Of the total symptomatology/illnesses reported after Vietnam, how many symptoms/illnesses are associated with potential Agent Orange exposure and how do the reported potential Agent Orange exposure symptoms/illnesses, categorize into physiological and psychological components in relation to the three time periods?

two to three symptoms were reported on the average per physiological system, with the eyes and ears and the GI systems reporting the largest mean number of symptoms. No conclusions were drawn concerning the presence of chronic health changes secondary to Agent Orange exposure for a number of reasons. Researchers have not agreed on how an individual was exposed to Agent Orange while in Vietnam nor if exposure to Agent Orange poses a risk with regard to long-term health effects. Symptoms of Agent Orange exposure have been identified only through extrapolating laboratory data and the symptoms/illnesses encountered in victims of industrial accidents (in plants that manufactured the chemicals that comprised Agent Orange) to Vietnam veterans. Victims of industrial exposure often manifest a variety of symptoms in the physiological and psychological systems of the body. Although there was no attempt to determine the presence of a pattern of potential Agent Orange exposure symptoms in any given respondent, the fact that a number of

respondents reported the maximum number possible of potential Agent Orange exposure symptoms within all but the GI physiological system merits investigation. This is especially important in view of the substantial number (46%) of respondents who served in locations in Vietnam that were potentially exposed to heavy Agent Orange application.

As with the overall symptoms/illnesses reported, there was a steady increase in reported potential Agent Orange exposure symptoms across the time periods before, during, and after Vietnam, again with the greater degree of increase found between the before and during Vietnam time periods (which in part was due to the small sample sizes of some of the systems). The latter phenomenon was prominent in the brain, eyes and ears, and skin systems. This may have been an indication that the symptoms reported within those systems were not associated with potential Agent Orange exposure, since the latter usually manifest as chronic symptoms.

The pattern of psychological symptoms of potential Agent Orange exposure that was observed mimicked that of the pattern of the total number of psychological symptoms with regard to the increase in symptoms that was evidenced across the three time periods. This was not surprising in that all of the psychological symptoms that have been associated with Agent Orange exposure are also symptoms of depression and/or posttraumatic stress disorder. Although the latter two categories are composed of several different symptoms, they also contain overlapping symptoms. Subsequently, the investigator was unable to identify the definitive psychological etiology

of any of the psychological symptoms that were reported. It is possible that the adding of the different symptoms in each category to reach a total score of psychological symptoms for each respondent resulted in an artificially high number of reported psychological symptoms.

Patterns of health care utilization were discovered among the sample. In addition, there were other factors discussed that may have affected the veteran's reported health care use pattern. Both the above findings responded to Research Questions 3a and 3b:

> What patterns of health care utilization are reported by the Vietnam veteran and what factors may be important in determining the veteran's pattern of health care use?

Much of the recent literature on the Vietnam veteran has depicted him as an individual who is set apart from any health care delivery system. However, three-quarters of this sample of Vietnam veterans reported having made a health care visit in the past year. During that time, the most popular health service reported by respondents was mental health care. This finding gave further confirmation to the conclusion that this sample included a number of individuals in need of psychological help. However, because of the exploratory nature of the study, it was not possible to determine if the respondents who reported psychological symptomatology were the same respondents who sought mental health care. If the respondents who reported the larger numbers of psychological symptoms had not obtained any mental health care, the implications for health care delivery to Vietnam veterans at the local level would differ markedly.

The types of health services sought by subjects in the past year were oriented to both illness-treatment and health-maintenance. A substantial number of respondents had gone for a check-up. It was unclear whether it was a general physical examination or an Agent Orange exposure screening examination, the latter of which has been provided by the Veterans Administration (VA) since 1978 for veterans who are concerned about possible health effects of Agent Orange exposure. If the two types of examinations did not contain any identical respondents, the number of respondents who sought a physical examination in the past year increases to 95%. Since the general population often procrastinates annual physicals, it seems unusual that such a large number of individuals in this sample, most of whom were from 25 to 35 years in age, would seek physical examinations, unless motivated by some other stimulus. Since the question of Agent Orange exposure among Vietnam veterans has frequently made national headlines in the past year, there may have been some health concerns generated in the Vietnam veteran population as a result of the publicity.

Another characteristic of Vietnam veterans regarding health care utilization that has been frequently cited by researchers was the veteran's tendency to avoid the use of VA facilities. However, in this sample, a substantial number (33%) of the respondents reported using only VA health care facilities in the past three years. Based on responses to other items, this was inferred as partly due to the possession of a VA disability classification and partly due to indigency among respondents. The small percentage of subjects

(16%) who had not used any VA facilities in the past three years cited ineligibility, lack of medical indigency, and distrust of the VA as the reasons that they had not utilized VA facilities, none of which were new findings in a survey of non-VA users.

The largest number of respondents were occasional VA-users. This seemed to be related to the presence or absence of a disability classification. It was inferred from the data that those respondents who reported only up to a 30% disability were obliged to utilize a combination of VA and non-VA services, in order to get the bills paid. These respondents were treated at the VA for their service-connected problem (VA disability) and at private facilities for their nonservice-connected problems. It can be concluded that a veteran who is experiencing a number of vague symptoms of recent onset within various systems of the body, as often has been the case with Agent Orange exposure claimants, who seeks assistance from the VA (other than for an Agent Orange screening exam), is likely to be turned away because he does not have a service-connected disability. This illustrates the need to inform the private health care provider of the health problems that are being experienced by the Vietnam veteran. The latter is especially important in view of the Vietnam veteran's frequent lack of a regular source of health care. Only 23% of this sample reported a regular source of health care. The latter would seem to be a necessity in a population in which 56% of the respondents self-rated themselves as only being in a fair state of health.

The research concluded with some correlational associations

between variables, in response to Research Questions 4a through 4e. Although the design had not met the criteria for hypothesis-testing, the large amount of data generated led to a number of speculations.

First, since many researchers have linked the incidence of physiological as well as psychological symptoms in the post-Vietnam period to combat exposure, it was thought that there would be an association between the total number of reported post-Vietnam symptoms/illnesses and a veteran's combat status, a response to Research Question 4a:

> Is there a relationship between the total number of post-Vietnam symptoms/illnesses reported and exposure to combat?

There was no association discovered utilizing Kendall's Rank-Order Correlation Coefficient (Kendall's Tau). This was thought to be attributable to the low representation of non-combat veterans in this sample. The latter would have added a margin of difference to the ordinal combat-classification system that was absent in a scale that was created ex post facto.

It was speculated that the total number of reported post-Vietnam symptoms/illnesses might have had an influence on the individual's self-rating of health and interval since his last health care visit, responding to Research Questions 4b and 4c:

> Is there a relationship between the total number of post-Vietnam symptoms/illnesses reported and the interval since the individual's last health care visit, and is there a relationship between the total number of post-Vietnam symptoms/illnesses reported and self-rating of health?

Again, no significant association was measured between variables. The gradations on the self-health rating scale may not have reflected discrete differences that would have facilitated a correlational association. The lack of association between total number of post-Vietnam symptoms/illnesses and interval since last health care visit may be evidence that intervening variables may dictate an individual's pattern of health care use more than his reported health status.

Since the Agent Orange issue had dominated the news media's coverage of Vietnam veterans' concerns for a number of months prior to the data collection period, it was appropriate to assess the impact of this publicity in an investigation of the symptoms of potential Agent Orange exposure present in a sample of Vietnam veterans. It was speculated that a veteran might tend to report more symptoms/illnesses of Agent Orange exposure if he had been well informed on the herbicide's potential for causing those symptoms.

After constructing another scale ex post facto relating to the respondent's knowledge and beliefs concerning Agent Orange, the investigator attempted to correlate the latter with the total number of post-Vietnam potential Agent Orange exposure symptoms reported in response to Research Question 4d:

> Is there a relationship between the total number of post-Vietnam potential Agent Orange exposure symptoms/ illnesses reported and the individual's knowledge and beliefs about Agent Orange?

No association was measured at the $p < .05$ level. One of the key

explanations offered for this phenomenon was that the relationship between the variables was not linear in nature; the total number of potential Agent Orange exposure symptoms may have increased with increasing Agent Orange knowledge and beliefs up to a point, after which there was no correlation between the two.

This explanation was also pertinent to the nonsignificant relationship that was encountered between the total number of post-Vietnam potential Agent Orange exposure symptoms reported and the level of potential Agent Orange exposure of the veteran's military station in Vietnam which responded to Research Question 4e:

> Is there a relationship between the total number of post-Vietnam potential Agent Orange exposure symptoms/ illnesses and the level of potential Agent Orange exposure of the individual's station(s) in Vietnam?

This variable was created by comparing the respondent's reported military station in Vietnam with a map of Vietnam released by the General Accounting Office that depicted the total number of Agent Orange spraying missions conducted from 1965 to 1970. It was inferred that a subject who was stationed in a potentially heavily exposed area may have been likely to develop symptoms of Agent Orange exposure. However, since even the agencies of the Federal government who have been charged with the study of the effects of Agent Orange are unclear as to the method of determining exposure, it may turn out that location of military station has nothing to do with one's likelihood to exhibit symptoms of Agent Orange exposure.

## Recommendations

The results would have been strengthened by using a larger

randomly selected sample. Use of an age-matched control group of either non-veterans or Vietnam Era veterans or both would also have been helpful. With these design features, test hypotheses could have been formulated and statistically tested. However, in view of the large number of variables in a little-researched area, an exploratory approach was helpful in illustrating variables which need greater clarification in future studies.

For example, there is a need for a more exact measure of combat status, not based on subjective judgments. A more detailed measure of combat would allow comparison between degrees of combat as utilized by Egendorf et al. (1981) which may be more meaningful than comparison between combat-noncombat status, especially in a war fought without traditional battlelines.

Determining potential Agent Orange exposure, whether of an area or an individual, will continue to be a problem because of the Department of Defense's (DOD) incomplete service records of troop deployments in Vietnam. If an epidemiological link is established between exposure to Agent Orange and the development of specific long-term symptoms/illnesses as a result of the investigations of Vietnam veterans that are underway at this writing, the DOD and the VA will need to consult the scientific community in establishing a standardized method of identifying level of exposure. These criteria for exposure would likely fall somewhere between self-report of exposure and analysis of fat samples of Vietnam veterans. In this way, the government can more adequately shoulder its responsibility on the Agent Orange issue and take the burden of proof

off the Vietnam veteran, with whom it presently rests.

Until these steps are taken, there may be a need to continue to research the impact of the Agent Orange issue in the private sector and to assess the influence of media attention. Subsequently, the Agent Orange knowledge/beliefs scale would need to be tested for reliability and validity, in order to be useful to other researchers.

Rather than relying on a questionnaire to uncover physiological symptoms/illness patterns, it may be more helpful to use an interview method which would resemble a health history, to obtain information about changes in level of health over the time periods before, during, and after Vietnam. In this way, the researcher could record personal or family medical history factors that are pertinent in the interpretation of reports of symptoms/illnesses. The psychological symptoms survey may be more effectively done in the guise of a standard psychological tool.

In part two of this research, the number of reported symptoms/illnesses were examined in relationship to selected psychosocial adjustment variables. These include substance use, job status and history, marital status, arrest and military disciplinary history, and educational attainment, many of which were examined over three and occasionally four time periods (the last of which was the present time period). Some of the preliminary data obtained from this phase of the research are provided in Appendix D. It is readily apparent from these data that certain variables need further investigation. A substantial percentage of this sample was

unemployed (24%, excluding respondents that were unemployed while in school) and had changed jobs seven times or more since returning from Vietnam. The highest percentage of post-Vietnam crime convictions was for assault, followed by public intoxication. Although some respondents had a history of disciplinary actions in Vietnam, only two respondents reported crime convictions prior to Vietnam (Appendix D).

The general pattern of alcohol and tobacco use (as well as drug use, although not presented in Appendix D) was low level or no use prior to Vietnam. That increased markedly during Vietnam, increased further after Vietnam, and decreased from the immediate post-Vietnam high level of consumption to its present level.

A wide variety of drugs, past and present, were used by this sample of respondents (Appendix D). Drugs such as inhalants and PCP have virtually no users at the present time, whereas a number of respondents report daily use of marijuana.

Another aspect explored in phase two of this work was a more detailed comparison between symptoms of depression, symptoms of posttraumatic stress disorder, and the psychological symptoms of potential Agent Orange exposure. It was questioned whether individuals who exhibited one of the two former patterns of psychological symptomatology would report similar numbers of physiological symptoms of potential Agent Orange exposure to the individuals with psychological symptoms of potential Agent Orange exposure. A Kendall tau correlation was run comparing these variables (Appendix D) that shows a positive correlation ($\underline{p} < .001$) between all of the

psychological symptom variables and the physiological symptoms of potential Agent Orange exposure, although the correlation coefficient between the psychological and physiological symptoms of potential Agent Orange exposure is slightly stronger than the other two variables' coefficient with the physiological symptoms of potential Agent Orange exposure. A possible explanation for the latter is that the psychological symptoms of Agent Orange exposure overlap the other two categories creating a better correlation coefficient. Further analysis is required.

A final area of interest in part two of this study dealt with a factor analysis of pertinent variables in those respondents who reported more than three symptoms (the lower limit of the average reported number of symptoms per system) in every system of the body, both physiological and psychological. Since there was no way of comparing the incidence of symptoms reported by this sample to the symptoms reported by the population at large, an alternate approach to this problem was to draw a portrait of the physiological, psychological, and psychosocial health of the Vietnam veteran who reported a comparative degree of poorer health than fellow subjects. By examining the demographic, military service, and psychosocial adjustment factors that set apart this individual, the investigator may be able to recommend how a health care delivery system can tailor itself to the veteran's needs, i.e., to the needs of an individual who may be in the most need of support from the health care system.

## Nursing Implications

Since the Vietnam veteran today often moves among the general population unobtrusively, he may be difficult to distinguish from the other clients encountered by a health care provider. His status as a veteran of the Vietnam War may first be uncovered during a health history. Although it is unlikely that he would give a true picture of his war experience to a health care provider during the course of a health interview, opportunities for this discussion will often present themselves to the sensitive health care provider at a later time, whether in the hospital setting or at the primary care level.

Regardless of the care setting, a nurse who is familiar with the potential symptoms/illnesses of Agent Orange exposure can act as both an advocate and a support for the Vietnam veteran who is experiencing puzzling multi-system symptoms. If acting as a primary care provider, the nurse can express the proper concern for a symptom such as numb extremities. Although one may not want to bring up the Agent Orange issue (unless more definitive research has been done on its long-term health effects), one can assuage many veterans' fears merely by demonstrating knowledge about Agent Orange when asked. The hospital nurse can be a useful informant for fellow health team members about Agent Orange, especially in articulating the element of fear of the unknown that is present in many Vietnam veterans' concern about their health. The nurse must stress that no one has the information to dismiss out-of-hand any expressed concerns about Agent Orange health effects.

It should be remembered that, regardless of the nurse's concern about Agent Orange or the psychological impact of the Vietnam War on a veteran, many veterans wish to put all war-related issues behind them. The health care provider must not force a discussion of the war but rather create a trusting, empathetic atmosphere in discussions with the veteran which would encouarge him to mention his Vietnam experiences if he so desires.

A nurse can act as a health advocate for the Vietnam veteran at the community level as well. By working with veteran self-help groups in the community, the nurse can create an avenue of communication between veterans and primary health care providers on health-related issues that are pertinent to the Vietnam veteran. In her oft-repeated role as coordinator of both social and health services at the local level, the nurse can be a key disseminator of information to members of the community who are interested in providing services to the Vietnam veteran.

By being in the vanguard of a network of supportive members of the community, the nurse is in a position to enhance the Vietnam veteran's level of trust in the health care delivery system. At the same time, she can serve as a model to other health care providers in the private sector who have abdicated all responsibility for veterans' health care to the VA. Adequate health services that are attuned to the needs of the Vietnam veteran are not possible unless the VA and the private sector jointly recognize the Vietnam veteran's problems and subsequently map out a plan for collaboration in provision of health services. In the meantime, the government needs

to extend outpatient services for nonservice-connected health problems to the Vietnam veteran, at least until a definitive policy on Agent Orange exposure is adopted by the VA.

# APPENDIX A

# AGENT ORANGE: AN OVERVIEW

## History of the Herbicide Program in Vietnam

The use of plant growth regulators began in the United States in the 1940s. The chemicals 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) were two of the most popular herbicides used for weed control on rangeland, rights-of-way, rice paddies, forests and other areas; this was because of their effectiveness at low application rates and their apparent low potential for causing toxic effects in mammals (Peterson, 1967; Young, Calcagni, Thalken & Tremblay, 1978, Chap. I, p. 1).

Toward the end of World War II, interest began to build within the Department of Defense (DOD) in exploring the potential use of herbicides in tactical military operations. By 1951, the herbicide mixture selected as having the greatest potential efficacy was a 50:50 mixture of the n-butyl esters of 2,4,-D and 2,4,5-T. In 1959, the first large-scale aerial military defoliation experiment was conducted at Fort Drum, New York. It was the success of this first test that led the Secretary of Defense to authorize the Crops Division of the Army to evaluate the technical feasibility of defoliating jungle vegetation in the Republic of Vietnam in 1961 (Irish, Darrow & Minarik, 1969; Young et al., 1978, Chap. 1, p. 2).

The DOD set forth two major goals of the herbicide program: defoliation of trees and plants to improve observation of the enemy and destruction of enemy food crops. In the early years of the herbicide program (1962-1965), the DOD experimented with a number of different chemicals, all of which were identified by the color code

on the drums in which they were stored.

The total amount of herbicides sprayed in South Vietnam between 1962 and 1971 has been variously calculated in gallons and pounds per acre, the exact number of which is dependent on the author citing the statistic. The report of the National Academy of Sciences (NAS) (The Effects of Herbicides in South Vietnam, 1974) estimated that, during the above years, 18.85 million gallons were sprayed over six million acres of Vietnam. Approximately eleven million gallons of the total herbicides sprayed was the 50:50 mixture of the n-butyl esters of 2,4-D, and 2,4,5-T, known as Agent Orange (Carr & McNally, 1980).

After the herbicide program had been in effect for several years, it was discovered that, during the manufacture of 2,4,5-T, the heating process required for synthesis resulted in a toxic trace contaminant; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) or simply dioxin. Although 2,4,5-T was a component of other herbicides (Agents Purple, Pink, and Green), it was believed that Agent Orange spraying was accountable for the majority of the dioxin deposited on Vietnam. The NAS (The Effects of Herbicides in South Vietnam, 1974) estimated that between 220 and 360 pounds of TCDD were released over Vietnam between August 1965 and February 1971. These calculations were based on a comparison of spray line data and/or quantity of herbicide used with the information provided by the DOD's HERBS computer tapes. These tapes included date, number of planes used, amount of herbicide dropped, and location of mission (Report by the Comptroller General, 1979). The HERBS tapes were

the major source of all mission maps and tabulations of herbicide operations in South Vietnam between August 1965 and February 1971, and were said to account for 86% of all missions flown (The Effects of Herbicides in South Vietnam, 1974).

Agent Orange was primarily used for forest defoliation (90%). An additional 8% was used for crop destruction. The remaining 2% was used on the ground or water for clearing vegetation around the perimeter of fire support bases and other military installations, on landing strips, enemy cache sites, and along the lines of communication (Report by the Comptroller General, 1979). Other than the ground application or helicopter spraying that was used for the latter purposes, the major portion of herbicide application was carried out from C-123 aircraft that had a 1,000 gallon-load capacity; they sprayed swaths 240 feet in width at an airspeed of 130 knots and an altitude of 150 feet. From 1964 onward, aerial spraying missions applied undiluted [domestic use routinely diluted it with water (Midwest Research Institute, 1967)] herbicide at a rate of three gallons per acre. Westing (1971) stated that this was the equivalent of 25.5 pound per acre of active ingredients, in the case of Agent Orange. This was substantially more than the 0.5 pound per acre rate that the Army quoted as effective in killing plants (Johnson, C., 1980). (In addition, the HERBS tapes showed that some areas were sprayed as many as 25 times in a matter of months.)

The spraying time needed was 3.5 to 4 minutes to dispense 950 gallons of chemical on a spray line of 8.7 statute miles, or 14

kilometers (Young et al., 1978). However, there were a number of factors that could alter this rate of delivery. The major variable was drift. "Drift from the target area was determined by: 1) altitude of the aircraft, 2) speed of the aircraft, 3) terrain, and 4) climate"(Report by the Comptroller General, 1979, p. 6). Although the Air Force estimated drift at 1-2 kilometers, some authorities (Meselson, 1970; Westing, 1971) speculated that drift could be as much as 20 kilometers. In addition to the above factors, drift was greatly enhanced by mechanical failure or enemy attack, the latter often necessitating dropping the entire load from altitudes of up to 10,000 feet. However, the DOD records show only 33 aborted missions out of 3600 Agent Orange missions flown from 1966 to 1969 (Report by the Comptroller General, 1979).

The DOD protocol for herbicide handling by personnel consisted of little more than general hand-washing, presumably because the DOD was unaware that many of the herbicides contained the toxic contaminant, TCDD.

> Personnel charged with the supervisory responsibilities of handling the herbicides were indoctrinated in appropriate safety precautions including the use of gloves and face shields as needed [Personnel handling the chemicals were encouraged to] take normal sanitary precautions and to maintain personal cleanliness to avoid skin and eye contact with the material. Contaminated clothing were to be washed before re-use. Spillage on the skin or in the eyes was to be rinsed copiously with clear water (Darrow, Irish & Minarik, 1978, p. 20).

The General Accounting Office (Report by the Comptroller General, 1979) released a reply that it received from the DOD in response to a question concerning any special precautions that were taken

to preclude accidental exposure of ground troops to herbicide spraying.

> [No special precautions were taken but] exposure was . . .very unlikely since DOD personnel did not enter a sprayed area until defoliation was complete [which] required approximately six weeks (Report by the Comptroller General, 1979, p. 5).

However, a study conducted by the General Accounting Office (GAO) with the help of the HERBS tapes revealed that a "large number of Marines [stationed] in the I Corps section of Vietnam from 1966 to 1969 were in or close to areas sprayed with [Agent] Orange on both the day of the spraying and within four weeks afterward" (Report by the Comptroller General, 1979, p. 8). The GAO was unable to determine any Army troops' proximity to spraying mission locations because of missing Army records that resulted from rapid troop withdrawal.

In view of the inaccuracy of the DOD's figures on troop deployment as it related to herbicide missions, it would seem that the DOD's assessment of the potential risk posed by herbicides to ground troops might be equally in error. This seems even more likely in light of the fact that the Air Force stated that "the quantity of herbicide that reached the forest floor is not known" (Young et. al., 1978, Chap. I, p. 20).

By the late 1960s, the news media began to carry reports (that filtered out of North Vietnam) of rashes, nausea,and numbness in extremities that were appearing in Vietnamese individuals that were alleged to have been exposed to herbicides. Additionally, there were reports of substantial increase in birth defects in infants

born in sprayed areas (Thomasson, 1979).

It was at this time, by coincidence, that the National Cancer Institute contracted with the Bionetics Research Laboratories to screen a large number of pesticides for possible carcinogenicity, mutagenicity, and teratogenicity. One of those pesticides was 2,4,5-T. The latter was given to an experimental group of pregnant mice, orally and subcutaneously. On the 20th day of gestation, the animals were sacrificed and compared to a control group who received no 2,4,5-T. All litters of the experimental animals were discovered to have a significant number of fetuses with cleft palates and cystic kidneys (Courtney, Gaylor, Hogan, Falk, Bates & Mitchell, 1970). It was later discovered that the true teratogen was TCDD, which was found to have been present in the 2,4,5-T at concentrations of 30 parts per million (ppm). However, this disclosure did not prevent the suspension of certain uses of 2,4,5-T that was announced jointly by the heads of the Defense and Agriculture Departments in April 1970. Together with selected domestic uses of 2,4,5-T, the use of Agent Orange was suspended at that time.

Following the latter suspension order, the DOD was faced with a surplus of slightly in excess of two million gallons of Agent Orange, of which it hoped to dispose in an environmentally safe expeditious manner. Although a portion of the remaining herbicide was still in Vietnam, most was in storage at Gulfport, Mississippi. In April 1972, the Agent Orange surplus that had remained in Vietnam after the suspension order was moved to Johnston Island in the Pacific Ocean. From 1971 to 1977, the government grappled with

various methods that were proposed for destruction and recovery of the herbicide. The State of Mississippi finally submitted a formal request to the Air Force in 1977, requesting removal of the Agent Orange from its Gulfport storage tanks. Subsequently, the Air Force received Environmental Protection Agency approval to remove the Agent Orange to the North Pacific Ocean for at-sea incineration (Whiteside, 1979).

Although the DOD had continued to officially minimize the potential risks of Agent Orange exposure, the protocol for herbicide handling had changed markedly by 1977, when dedrumming took place in Gulfport. The Air Force utilized the following guidelines:

> All men working within the dedrum facility were provided [with] protective clothing including cartridge respirators, face shields, rubber aprons and rubber gloves" (Young et al., 1978, Chap. 2, p. 4).

All personnel were given pre-operational and post-operational physical examinations that included a complete medical history, complete neurological examination, and an extensive laboratory work-up. It is intriguing that, in 1977, the DOD felt that extensive health monitoring was necessary for herbicide handlers at Gulfport. This was the same agency who, a year or two later, fought tooth-and-nail the claims of exposure from Vietnam veterans who had also handled Agent Orange, often without protective clothing.

## The Role of Industry

The Dow Chemical Company was the major manufacturer of 2,4,5-T. When the executive order was issued to suspend domestic and

military uses of 2,4,5-T in April 1970, Dow was the first to lodge a protest with the Bionetics Laboratory about the conclusions of its research. It was TCDD, not 2,4,5-T, that was a teratogen in the laboratory experiment, proclaimed Dow (Johnson, J., 1971), failing to mention that the TCDD had inevitably accompanied the manufacture of 2,4,5-T that was contained in a number of herbicides used in Vietnam (Epstein, 1980). Dow alleged that the commercial 2,4,5-T contained less than 1 ppm of TCDD, in contrast to the experimental level of 30 ppm. [It should be noted that the Agent Orange that was stockpiled in Vietnam was found to contain as high as 47 ppm of TCDD (Young et al., 1978)]. To prove its claims, Dow Laboratories conducted research in which pregnant rats were given an oral dose of 2,4,5-T with 1 ppm TCDD on days 6 through 15 of gestation. The 2,4,5-T doses ranged from 0 to 24 mg/kg/day. Fetuses harvested on day 20 of gestation showed no visual or histopathological teratogenic or embryotoxic effects (Johnson, J., 1971).

Dow has cited results from 40,000 research papers conducted over a 30-year period that support its contention that 2,4,5-T is safe for normal agriculture use, i.e. diluted with water at 0.5 pound per acre [a fraction of its level of application in Agent Orange (Hay, 1970)]. However, the impact of Dow's allegation was somewhat mitigated by the criticism it received concerning its laboratory techniques from the Environmental Protection Agency (EPA). Research conducted by the EPA to compare the TCDD extraction methods of five laboratories utilized fat and milk samples

spiked with 0.8 parts per trillion (ppt) dioxin for analysis. The five participants were Dow Chemical, Harvard University, University of Nebraska, Wright State University, and the EPA Health Research Laboratory in North Carolina. The poorest extraction methods were demonstrated by Dow and by Wright State. Dow argued that its unfamiliarity with the technique required by the EPA accounted for its poor showing; Dow believed it would have performed more reliably if using its own extraction methods (Hay, 1979).

Another aspect of the friction between Dow and the Federal government stemmed from the fact that Dow had been aware of the presence of TCDD in its 2,4,5-T in 1964, but had not informed the DOD or the Department of Agriculture (Epstein, 1980). When questioned about this at a Congressional hearing on 2,4,5-T in 1970, Johnson (1971) stated that this was not important because the contamination problem had been corrected in a new plant that began operation in 1966. Dioxin concentration was said to be 1 ppm. For this reason, Johnson concluded that there was little risk of TCDD exposure for United States soldiers in Vietnam. However, as mentioned previously, Air Force samples of the inventory on Johnston Island taken in 1972 showed as much as 47 ppm of TCDD. The estimated date of the origin of the surplus Agent Orange was 1964 (Young et al., 1978, Chap. I., p. 21). This indicated that Dow's corrective measures may have had little effect on the TCDD exposure of veterans.

Dow continued to maintain that the potential risks of Agent Orange exposure, i.e., dioxin exposure, were miniscule. At one

point, Dow stated that dioxin was ubiquitous in the environment as a product of any normal combustion process. Dow alleged that TCDD's lack of solubility in water would prevent it from being taken up by plants, especially since it was supposedly biodegraded rapidly by ultraviolet light. Also, the manufacturer believed that there was little tendency for the dioxin to concentrate in body fat. [A pilot study conducted by the VA in 1980 of two groups of veterans, exposed versus non-exposed (not in Vietnam), showed a third of the respondents to have 3 to 19 ppt of dioxin in their bodies, the higher amount being in the fat of exposed veterans (Carr & McNally, 1980)].

## The Role of the Scientific Community

All of the components of Agent Orange have been implicated in causing deleterious health effects, by various researchers. However, since TCDD is so much more toxic than either 2,4-D or 2,4,5-T, nearly all of the Agent Orange research has focused on dioxin. All of the information that is available to researchers today is a product of laboratory experiments with animals, reports of industrial accidents or untoward effects of environmental herbicide use.

In the investigation of the toxicity of any chemical, it is necessary to ascertain the highest dose that produces no effect, the lethal dose for 50% of the experimental sample, and the lethal dose for 100% of the sample. The chief problem with TCDD is that these figures vary from species to species. For example, mice and

rats are killed by a single dose of dioxin less than a hundred-millionth of their body weight, whereas guinea pigs are killed by less than a billionth of their weight. Some researchers feel it would be more meaningful to feed animals a sub-lethal dose of TCDD over time in order to observe them for physiological dysfunction as well as patterns of metabolism relating to dioxin (Thomasson, 1979).

Allen was one of the first researchers to develop the technique of measuring body levels of dioxin in parts per trillionth (ppt). Allen fed female rhesus monkeys a diet containing 500 ppt of dioxin over a period of nine months. He observed a 38% incidence of tumors among the test animals as well as a 50% mortality rate which he attributed to malabsorption of nutrients which led to weight loss and generalized hemorrhage throughout the body secondary to anemia and low platelet count (Tarbell, 1978).

An explanation for the monkeys' deaths can be extrapolated from the findings of Piper, Rose, Leng and Gehring (1973). They found that a single oral dose of 50 ppt dioxin (marked with carbon-14) when given to rats, localized in liver and fat tissue at levels ten times higher than in other tissues. The liver is essential for proper operation of the body's hematological system. It seems plausible that a monkey could have become anorexic from the dioxin diet and subsequently lost weight; the weight loss could have caused extraction of TCDD from the fat tissues, increased circulation of TCDD to the liver, and subsequently caused an increased rate of hepatic necrosis. Liver cell death would have resulted in a

decreased ability of the liver to process red blood cells, coagulation factors, and platelets, which ultimately would have caused hemorrhage.

Researchers have observed atrophy of the thymus gland in rats, mice, and guinea pigs who received TCDD. Since the thymus has been associated with the immunological system in humans, it may have accounted for the findings of Vos, Moore and Zinkl (1974) who observed a suppression of cell-mediated immunity in the lymphoid system of mice at doses of 2 and 5 ppt TCDD.

Green (1977) found chromosomal abnormalities in rats of both sexes who had received 4 ppt TCDD for 13 weeks. Green (1977) also found that a large proportion of TCDD (that had been given in a single dose) was maintained in an unmetabolized form in the microsomes of the rat's liver and slowly excreted over time. Normally, the half-life of dioxin in rats was approximately two weeks with the primary excretory route being the feces (Gasiewicz & Neal, 1978; Young et al., 1978; Chap. IV, p. 60).

Researchers were universally reluctant to apply laboratory findings on TCDD to humans. The general attitude was summarized in Congressional testimony:

> Although dermatologic, internal and neurobehavioral toxic effects have been observed in animals treated with TCDD, this is not easily extrapolated to humans. Because TCDD persists in the body for a prolonged period of time, disease effects can be the result of low-level chronic exposure (Moore, 1979).

The problem was that no sample had been confirmed to be representative of chronic low-level dioxin exposure. Although the

routine occupational exposure was, in most cases, at a much lower dose rate than that of industrial accidents, the exposure was prolonged, therefore effectively raising the total dose. The actual dose of dioxin was not known in cases of occupational exposure. Subsequently, the scientific community was forced to extrapolate the effects of low-level occupational exposure from the health effects in the victims of industrial accidents and environmental TCDD exposure.

Industrial accidents usually occurred during the handling of an intermediate product of TCDD known as trichlorophenol (TCP) or when an explosion occurred. The first recorded industrial accident was in a Nitro, West Virginia plant in 1949. From a total of 228 workers exposed to dioxin, 121 developed chloracne, considered by some to be the hallmark of exposure to dioxins. These persons were followed for 30 years and found to have no excess in total mortality from malignant neoplasms or diseases of the circulatory system (Zack & Suskind, 1980).

Chloracne is a type of acne caused by overproduction of keratin in the sebaceous ducts. Although it may resemble juvenile acne in its formation of comedones or blackheads, it often progresses to cyst formation, large inflammatory lesions, abscesses and scar tissue. Mild cases may only involve the temples and the areas in front of and behind the ears. However, more severe cases will spread down the face, the neck, the chest, and the extremities, excluding the hands and feet. An additional site of involvement is the genital area, which is not usually seen in other forms

of acne. Chloracne may appear as early as two to three weeks after the first exposure, or there may be a delay of several months. Typically it is recurrent (up to 15 years or more), although its severity does not necessarily reflect the degree of exposure to TCDD. Although most researchers believe that systemic disease does not result unless chloracne is present before or during the course of the disease, there is no general understanding how systemic (as opposed to external) absorption of TCDD can result in chloracne (Young et al., 1978, Chap. VI, pp 20-21).

The most widely renowned industrial incident occurred in Seveso, Italy in 1976. A reaction vessel in a TCP plant exploded sending a toxic cloud of TCDD into the air. An area two to five kilometers long and 700 meters wide was contaminated. Samples of the escaped product was estimated to contain 35,000 ppm TCDD. Over 700 people were evacuated from the area. Hundreds of animals died in the following three days, and 187 children contracted chloracne. An investigation two years after the incident showed that all but two of the children had had chloracne resolve. The data also indicated that the rates of spontaneous abortions, fetal malformations, congenital defects, chromosome abnormalities, reactions to infectious disease, and morbidity-mortality rates were not affected by TCDD exposure. However, there has been controversy concerning the number of malformations; a group of scientists and Seveso citizens alleged that the number of malformations in reality was three times higher than the figures released by the Italian government. It will be years before the extent of the long-term health effects

of TCDD exposure can be assessed (Carr & McNally, 1980).

Two incidents in the United States were illustrative of the impact of public opinion on the dioxin issue. In 1971, in a horse arena in Eastern Missouri, 54 out of 57 horses died after an oil spraying which was designed to control dust. In the weeks following, hundreds of birds, rodents, and domestic animals also died. Of the people in the immediate area, the most serious health effect occurred in a 6 year old girl who developed hemorrhagic cystitis. Three other people in the family developed milder symptoms of headache and nausea.

After similar incidents occurred at two other horse arenas in the area, investigators traced the problem to the tank that had stored the used motor oil, which had been used in all of the arenas. The tank had been formerly used by a hexachlorophene plant. The sludge in the tank was found to contain high concentrations of TCDD. However, it was not until 1974 that soil samples from the first arena were analyzed and discovered to have 31.8 to 33 ppm of TCDD (Commoner & Scott, 1976).

The child who had hemorrhagic cystitis was observed for a five-year period and was found to have normal growth and development. This does not seem unusual, however, since TCDD has been shown to be stored in fat tissue. A 6 year old child would not have been likely to have much fat tissue from which TCDD could be released to cause chronic health problems.

The other domestic incident relating to the dioxin issue occurred in Globe, Arizona in 1969. Prior to the release of the

National Cancer Institute's report on 2,4,5-T, the United States Forest Service used 120 pounds of 2,4,5-T for brush control in a canyon near the city. During the spraying and immediately thereafter, complaints were received concerning vegetation damage, animal deformities, and human illnesses. A few months afterward, a government team of researchers from the United States Department of Agriculture's (USDA) Office of Science and Education was sent to investigate the allegations. Although a herbicide drift factor was confirmed and some plant damage noted, no unusual illnesses or animal mortality were found (Tschirley, Binns, Cueto, Eliason, Heggestad, Hepting, Sand, & Stephens, 1970; Young et al., 1978, Chap. V, p. 22). However, the public outcry in Globe was the subject of newspaper and magazine articles alike as well as television reports. The USDA team stated that the emotionalism of the community was a contributing factor to the uproar.

Interestingly, a follow-up of the Globe incident was reported this year. Five Globe families were awarded a financial settlement from Dow Chemical and the Forest Service, presumably to avert a trial. The Globe families had claimed permanent injuries from the herbicide sprayings of 1968 and 1969. One of the stipulations of the settlement was that Dow did not admit liability by settling. (Beard, 1981). Why did Dow feel it necessary to settle out-of-court after the absolution it received from the USDA study? Dow's action implies that it desires to keep a low profile on the dioxin issue, whatever the reason.

A number of symptom trends have been observed among victims

of dioxin exposure (Tables 25, 26, 27, 28). The symptoms include: skin, liver, and nervous system symptoms as well as a substantial number of eye and gastrointestinal symptoms. The tabular material was reprinted by written permission of the author (Moses, M. 2,4,5-T Agent Orange and tetrachlorodibenzo-p-dioxin: Evolution of the problem. Paper presented at the Recent Advances in Occupational Medicine, New York City: Environmental Sciences Laboratory, October 15, 1970.)

## The Vietnam Veteran and the Veterans Administration

It is evident from the previous information that an untold number of veterans had contact with Agent Orange, and therefore with dioxin, while in Vietnam. The routes of entry varied from soldier to soldier. The individual might have had skin or inhalation contact with the herbicide as it was being sprayed, or exposure may have occurred merely through ingestion of contaminated food and water. At the time of exposure, it was likely that the individual was more concerned with survival than the potential risk presented by the herbicide. Unaware of his exposure to a toxic chemical, the Vietnam veteran returned to begin his acclimatization to civilian life.

By the late 1970s, a number of veterans were experiencing a variety of vague symptoms. From interviews with veterans seeking disability classification, an employee of the Veteran's Administration Chicago claims office began to notice a pattern in the

Table 25

Effects on the Skin and Mucous Membranes in Humans Exposed to TCDD

| |
|---|
| Chloracne |
| Hyperpigmentation |
| Hypertrichosis |
| Edema and erythema |
| Blepharonconjunctivitis |
| Conjunctival cysts |
| Sties |

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Table 26

Effects on the Liver in Humans

Exposed to TCDD

| Clinical Findings |
| --- |
| Hepatomegaly |
| Right upper quadrant tenderness, pain |
| Hepatitis |
| Hepatic porphyria |
| Increased excretion uroprophyrins |
| Porphyria Cutanea Tarda |
| Liver function test abnormalities in Alkaline phosphatase, SGOT, SGPT, Bilirubin, Bromosulfophthalein |

Note. Reprinted with written permission of Dr. M. Moses (Moses, M. 2,4,5-T Agent Orange and tetrachlorodibenzo-p-dioxin: Evolution of the problem. Paper presented at the Recent Advances in Occupational Medicine, New York City: Environmental Sciences Laboratory, October 15, 1978.)

Table 27

Effects on the Nervous System in Humans Exposed to TCDD

| |
|---|
| Headache |
| Lower extremity weakness |
| Difficulty in walking |
| Ataxia |
| Paresis |
| Hearing loss |
| Loss of sense of taste, odor |
| Lack of vigor, drive |
| Easy fatigability |
| Insomnia |
| Hypersomnolence |
| Personality change |
| Emotional instability |
| Depression |
| Diminished ability to learn |
| Memory deficits |
| Decreased libido |
| Impotence |
| Abnormalities in psychological tests |
| Abnormalities in tests of motor and sensory peripheral nerve function |
| Abnormalities in nerve biopsy |

Note. Reprinted with written permission of Dr. M. Moses (Moses, M. 2,4,5-T Agent Orange and tetrachlorodibenzo-p-dioxin: Evolution of the problem. Paper presented at the Recent Advances in Occupational Medicine, New York City: Environmental Sciences Laboratory, October 15, 1978).

Table 28

Effects on the Gastrointestinal System

in Humans Exposed to TCDD

| |
|---|
| Weight loss |
| Anorexia |
| Abdominal pain |
| Post prandial flatulence |
| Nausea/vomiting |
| Gastritis |

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reported symptoms: skin rashes, numbness of extremities, decreased memory, and sexual disorders. Many veterans reported that the symptoms had just recently begun, often following a period of weight loss. Some veterans stated that they had had birth defects in their children post-Vietnam. All of the veterans remembered being sprayed with herbicides in Vietnam. The VA employee contacted a reporter for a CBS affiliate in Chicago. The resulting television documentary, "Agent Orange: Vietnam's Deadly Fog", produced in March 1978 alleged that a number of Vietnam veterans were suffering from dioxin poisoning.

Later that year, a Vietnam veteran who was dying of stomach cancer, which he attributed to Agent Orange, founded a veterans advocacy group called Agent Orange Victims International (AOVI). AOVI began to compile and disseminate to other Vietnam veterans all available information, national and international, on dioxin, ranging from laboratory and industrial accident data to reports of local incidents based purely on hearsay. AOVI was the rallying point for veterans planning legal action. In January 1979, Reutershan, as a representative of AOVI, filed a class action suit against Dow Chemical and the United States government on behalf of all Vietnam veterans, seeking damages for health injuries sustained as a result of Agent Orange exposure. [Class action suit status was awarded in December 1980 by U.S. District Court Judge Pratt. The ruling permitted the pursuit of damage claims against the chemical manufacturers but disallowed any suit against the Federal government. Dow Chemical has filed a countersuit in which it seeks

to place all liability for Agent Orange claims on the Federal government. (Associated Press, 1980)]. AOVI's most recent action was the opening, in June 1981, of a medical clinic. The clinic is staffed with a multidisciplinary health team; it was designed to provide health care, information, counseling, and other support services to the Vietnam veteran and his family.

Other veteran advocacy organizations, like Citizen Soldier and Vietnam Veterans of America, have endeavored to present the government with data on the prevalence of Agent Orange exposure symptoms in the Vietnam veteran population. Citizen Soldier conducted a mail survey of 1,200 Vietnam veterans in the New York City area. Agent Orange exposure was determined by self-report only. Tentative associations were made between variables based on self-reports of exposure. For example, veterans who reported skin conditions might be 30% to 80% more likely to father children with birth defects. The study was limited by the absence of a control group and a random sample (Stellman, S., 1980). Vietnam Veterans of America (VVA) is at present conducting a similar study with a larger sample. A lengthy questionnaire attempts to verify the veteran's self-report of exposure with detailed questions about his military duties as they related to potential Agent Orange exposure as well as his map location when in Vietnam. It is possible that the VVA may use the DOD's HERBS tapes to evaluate the individual's proximity to spraying missions.

The Agent Orange issue quickly became a problem for the Veteran's Administration (VA) following the TV broadcast. Partially in

response to the flood of compensation claims that ensued, the VA issued guidelines to its hospitals and regional offices, in September 1978, for the establishment of Agent Orange screening examinations (Veterans Administration, 1979).

The implied directive within the memorandum was that personnel were to offer screening examinations only to Vietnam veterans who requested them. The screening examination was to proceed after the veteran stated that he believed he had been exposed to herbicides in Vietnam.

First, a health history was taken. The veteran was asked detailed questions about his alleged exposure. These included: a) how many times were you exposed?, b) what was the nature of your exposure:, c) when and where did the exposure occur?, d) how direct was your contact with the herbicide?, e) what was the severity of the exposure? (Hearing before the Subcommittee, 1978).

It seemed ludicrous that the VA would expect an individual to have this information six to twelve years after the war, especially since he had not been aware of any potential danger at the time of the exposure. VA policy has traditionally dictated that an individual's medical record must indicate that his health problem is service-connected in order to qualify for a disability classification. Obviously, there had been no medical evaluation of the effects of herbicide exposure while the individual was in Vietnam. Even if the potential risks had been recognized, it is doubtful that the symptoms would have been linked to herbicides. Even chloracne varies widely in presentation from individual to individual.

Following the health history, the veteran might have received a physical examination, if the screening physician deemed it necessary. Also if his signs and symptoms warranted, the veteran would have blood studies. There was no standard procedure concerning the actual examination (Hearing before the Subcommittee, 1978).

Between 1978 and 1980, veterans began to complain about the VA's treatment of the Agent Orange issue. Congressional hearings were held concerning Agent Orange to investigate the charges. VA administrator Cleland appeared before the Subcommittee on Oversight and Investigation of the House Interstate and Foreign Commerce Committee in 1980. He assured the committee that no eligible veteran who was concerned about Agent Orange was being denied medical care by the VA. Several weeks later, the administrator phoned random VA facilities around the country, posing as a Vietnam veteran in search of information about Agent Orange. He found that no one had the knowledge or the willingness to help with this problem (Bonior, 1980). This lack of compliance with VA directives and/or disinterest in the Agent Orange issue was supported by the findings of the General Accounting Office. The GAO discovered that no special instruction were given to regional offices on the need to refer a herbicide-related claim to a VA health facility. "About 33% of the 50 final ratings of possible exposure at the regional offices had no indication of a recent VA physical examination" (Report by the Comptroller General, 1979, p. 13).

As of February 1981, the VA had logged 6,164 disability claims that had been attributed by veterans to Agent Orange exposure

(Daschle, 1981). Only five claims have been allowed by the VA, largely on the basis of chloracne. The presenting symptoms vary with the individual and include all systems of the body (Table 29). Sixty thousand veterans had requested Agent Orange screening exams as of August 1980 (Associated Press, 1981). The VA is now compiling the results of the Agent Orange screening examination medical histories into a herbicide registry for Vietnam veterans who suspect they have been exposed to Agent Orange. Tissue samples for these veterans are sent to the Armed Forces Institute of Pathology for analysis of long-term effects of herbicide exposure. Despite these improvements, the VA still has not been instructed to obtain information from military records that might be helpful in pinpointing the likelihood of exposure such as occupational specialty, duties performed, unit location, and dates in Vietnam (Report by the Comptroller General,1979).

The VA has continued to plead lack of data. It alleges that the non specific nature of many of the potential exposure symptoms, such as fatigue, make it difficult to determine their etiology. The VA also believes that, due to the passage of so many years, the impact of intervening variables have to be assessed before attributing any illnesses to Agent Orange.

The VA hopes to discover the answer to the Agent Orange issue after it completes the large-scale epidemiological study of Vietnam veterans that was mandated by Congress. It is just one of the agencies of the Federal government who has been called upon to study the herbicide issue. An interagency work group, composed of

Table 29

Categories of Alleged Agent Orange

Exposure Symptoms/Illnesses

| Symptoms/Illnesses | N |
|---|---|
| Skin condition (acne, alopecia, keloids, and urticaria) | 2,941 |
| Nervousness, headaches, and fatigue (alleged) | 2,668 |
| Paralysis and numbness and other symptoms of extremities | 913 |
| Gastrointestinal and genitourinary conditions | 735 |
| Malignancies (leukemia, lymphoma, melanoma, etc.) | 363 |
| Impaired sexual activity (alleged) | 307 |
| Eyes, ears, nose, throat pathology | 409 |
| Lung condition | 276 |
| Cardiovascular and hypertension | 219 |
| Miscellaneous | 134 |

representatives of the VA, USDA, DOD, EPA, Health and Human Services, and Occupational Safety and Health Administration was formed in February 1980, and will coordinate the goals and the work of various agencies. The objectives are as follows:

> 1. To attempt to correlate the incidence of illness and diseases among Vietnam veterans with their exposure in Vietnam to Agent Orange, in part by determining insofar as possible if Vietnam veterans are as healthy as other population groups.
>
> 2. To study the broader implications for public health in the United States and elsewhere raised by the continued use of substances containing dioxin (Bernstein, 1980, p. 14).

## The Role of the Federal Government

It is most meaningful to examine chronologically the role of the Federal government in exploring the Agent Orange issue. Following the National Cancer Institute's study revealing 2,4,5-T, as a teratogen (later to be discovered to be TCDD), the Senate Subcommittee of the Committee on Commerce, under the sponsorship of the late Senator Hart, conducted the first hearings on 2,4,5-T. The outcome of the hearings was the issuance of the executive order to limit 2,4,5-T's use, domestically and in Vietnam. It was not known at that time that the health risk was posed by the dioxin contaminant of 2,4,5-T's use. This ruling served to end Agent Orange use in Vietnam in April 1970 (Hay, 1979). The last herbicide mission was conducted in Vietnam in February 1971 (Young et al., 1978).

The Senate, in spite of having received testimony from Dow Chemical and from the Pentagon [who had in 1969 commissioned a large-scale study of the environmental impact of domestic herbicide use which had showed no ill effects to the flora and fauna of

regularly sprayed areas (Midwest Research Institute, 1967)] as to the safety of 2,4,5-T, believed that there was enough uncertainty about the herbicide to warrant further investigation before continuing widespread agricultural or military use.

Subsequently, the two most eminent private scientific organizations in the country, the National Academy of Science (NAS) and the American Association for the Advancement of Science (AAAS), were requested to plan research of the effect of the herbicide program in Vietnam. The AAAS sent a team of scientists to Vietnam for a five-week inspection tour. The researchers obtained samples from fish, mother's milk, and human tissue that contained levels of dioxin that were located upstream from Agent Orange spraying sites (Meselson, Westing & Constable, 1971). The milk samples were found to have 40-50 ppt of TCDD. Domestic studies, such as the one conducted by Shadoff, Hummel & Lamparski (1977) of mother's milk samples taken from women residing in a West Texas region that had been sprayed with 2,4,5-T for 20 years in order to control brush, often do not detect any TCDD at the 10 ppt limit. (This would seem to support the notion that the TCDD concentration in the 2,4,5-T in military herbicides was either considerably greater or that it accumulated in the environment because of far heavier application than would have resulted from domestic use.) The scientists also examined hospital records for increases in unusual birth defects. The outcome of the survey of hospital records was the discovery that the stillbirth rate in Tay Ninh province, a heavily sprayed highland area, was 64 per 1000, well above the country's average

of 31.2 per 1000. This finding contradicted the results of an Army investigation conducted in 1968 and 1969 that found no increase in the incidence of stillbirths. Despite the above findings, the AAAS team concluded that the threat to man was minimal from direct spraying as well as from entrance into the food chain because of ready excretion of herbicides from the body (Meselson, Westing & Constable, 1971).

At the direction of Congress, the NAS sent a team of researchers to Vietnam in 1974 to investigate reports of illness and birth defects among the Montagnards (Tung, Anh, Tuyen, Tra & Hugen, 1971). A North Vietnamese physician had studied 179 men, women and children who had lived in sprayed areas for periods ranging from two months to five years. Their exposure was validated by chemical analysis of grain, vegetables and fruit in the area. Tung described acute effects from herbicide exposure as well as secondary effects which were divided into three categories: an ocular syndrome, a genetic syndrome characterized by chromosomal alterations in adults and congenital malformations, and prolonged asthenia. The last includes the following symptoms:

> headache, apathy, fatigue, anorexia, weight loss, sleep disturbances, decreased learning ability, decreased memory, dyspepsia, sweating, muscle pain, joint pain and sexual dysfunction (Young et al., 1978, Chap. VI, p. 22).

One of the goals of the NAS mission in Vietnam was to determine the validity of Tung's study. The conclusion was that this study did not have a sufficient scientific basis, and that it was typical of the North Vietnamese propaganda, which for years had

been accusing the United States of poisoning the Vietnamese people (The Effects of Herbicides in South Vietnam, 1974).

The NAS surveyed hospital records in the same way that the AAAS team had, but found no significant increases in birth defects. However, the hospitals surveyed also were generally in urban areas which had not been as heavily sprayed. Also, the hospitals did not generally serve the rural population. Subsequently, the researchers were forced to search out potential spraying victims among the peasant population. Interviewing the peasants was a complicated matter. Not only were self-reports unreliable but the birth of a deformed child was regarded as a loss of face and a curse among tribal peoples, resulting in a very slight chance of a family reporting a birth defect (Neilands, 1972).

The NAS found levels of dioxin in fish and shellfish taken from rivers in South Vietnam. The levels ranged from 70-810 ppt in fish from the interior to 18-79 ppt in fish from the coast. This discovery led the NAS to express concern about dioxin in its final report, while cautiously stressing the lack of sufficient data on which to base a firm conclusion.

Early in the 1970s, the Environmental Protection Agency (EPA) became involved in the exploration of the risks of phenoxy herbicides. General hearings conducted by the EPA in 1974 were suspended for lack of sufficient data. However, out of these hearings emerged a Dioxin Implementation Plan which was to span five years. Its goals were to evaluate the effectiveness of the present methodology for analyzing TCDD in the laboratory and to further

investigate the toxicology of TCDD pertaining to its presence in beef cattle, mother's milk, aquatic life, rice, and other birds, mammals, and fish that inhabited sprayed areas (Environmental Protection Agency, 1974). The initial phase of the project, conducted in 1975, analyzed beef fat and liver samples from cattle known to have been exposed to 2,4,5-T. Analysis of the fat tissue showed 20-60 ppt in 3.5% of the exposed cattle. No TCDD was found in liver samples (Ross, 1976; Young et al., 1978, Chap. III, p. 16). The final report of the project was not available at this writing.

The most significant contribution that the EPA has made to date concerning 2,4,5-T and dioxin occurred in 1979, as a result of an EPA study of pregnant women in Alsea, Oregon. The Forest Service had been using 2,4,5-T for weed control in Alsea for a number of years. The EPA compared the number of miscarriages in women in Alsea to the miscarriages of women in two non-sprayed areas in Oregon. The Alsea women were found to have three times as many miscarriages as the control groups, and most of the miscarriages occurred in June just after the peak spraying period in March and April (Cookson, 1979). While acknowledging the epidemiological limitations of the study, the EPA maintained that the suspicion of a link between the miscarriages and exposure to 2,4,5-T was strong enough to warrant the enactment of an emergency ban on some uses of 2,4,5-T. Exempted from the ban was weed control on open rangeland and rice fields.

Most of the herbicide research conducted by the military has

been done by the Air Force. From 1962 to 1970, the Air Force Systems Command maintained a three-square kilometer area at Eglin Air Force Base in Florida which was treated with 73,000 kilograms of 2,4,5-T (and 77,000 kilograms of 2,4-D). Field investigations were conducted of the exposed ecosystem from 1973 to 1978. Residues of TCDD were still found to be present in the soil in 1978, at levels from 10 to 1500 ppt. Plants, birds, insects, fish, reptiles and mammals were also examined. No TCDD was found in any plant. Although TCDD was found in varying levels within all of the above animal species, no gross pathology was observed. Since mice alone would have been removed by 24 to 40 generations from the originally exposed mice population, the Air Force felt this study substantiated the conclusion of other authorities that long-term, low-level exposure to TCDD may not be teratogenic, mutagenic, or carcinogenic (Young, 1974).

However, the report that the Air Force submitted to the House of Representatives Veterans Affairs Committee in October 1978 presented somewhat vague conclusions. After a comprehensive review of the literature on all aspects of the herbicide issue, the Air Force stated that no relationship existed between many alleged exposure symptoms and exposure to Agent Orange in Vietnam but also admitted that there was uncertainty regarding the long-term effects of large acute doses of TCDD as well as small intermittent doses of TCDD (Young et al., 1978). Subsequently, the Air Force proposed to study, over a period of six years, the health of 1,200 airmen who had been involved in herbicide handling during Project Ranch Hand

in Vietnam (As of May 1980, it had not yet begun because the Air Force was awaiting protocol approval from the Office of Science and Technology Policy).

The National Institute of Environmental Health Sciences sponsored a joint international conference with the International Agency for Research on Cancer of the World Health Organization in an effort to coordinate all the existent research on dioxins. One of the recommendations of this conference was that an international registry of exposed persons be established to facilitate long-term follow-up (Joint ad hoc Working Group, 1979).

The actions of the Federal and state legislatures have been very important in the Agent Orange issue. Several states (New York, New Jersey, and Texas) have passed laws that address the Agent Orange issue and support the investigation of the problem. A few interested Congressmen have been instrumental in the passage of some key bills relating to Agent Orange. Public Law 96-151 (Veterans Health Programs Extension and Improvement Act, 1979) passed December 20, 1979, was the bill that ordered the VA to implement a large-scale epidemiological study of the effects of Agent Orange on veterans' health. The Veterans Health Care Act of 1981 (Report to the full House, 1981) which recently passed both houses in slightly different forms, authorizes the expansion of that study. A House amendment to provide assumption of exposure until proved otherwise (and thereby take the burden of proof off the shoulders of the Vietnam veteran) was defeated. Despite the opposition from private industry and various federal agencies, the Agent Orange

issue is still alive in Congress.

## Summary of Pertinent Questions on Agent Orange

It is clear that the laboratory data of dioxin's effects on animals and the industrial accident reports each have limited utility in predicting the long-term human effects of chronic dioxin exposure. The former's lack of usefulness is based on the variation between the species in their reaction to dioxin exposure. Young et al. (1978) listed some limitations of the extrapolations made on the basis of industrial accidents: a) The population was usually composed of adult males, who were exposed to chemicals in combination. This would make it difficult to decide the true chemical culprit in disease causation; b) Industrial accidents normally caused a higher level of exposure in the worker than he would have experienced in daily occupational exposure. c) The data on the health effects from industrial accidents very seldom controlled for preexisting health factors.

In relation to the Vietnam veteran, how can it be determined if he was exposed to Agent Orange in Vietnam? Since the HERBS tapes account for only 86% of the missions flown and the Army troop deployment records are missing, determining the location of many individuals in relation to Agent Orange spraying is impossible. Fat biopsies for determining dioxin exposure have proved unreliable predictors. In the VA's research of a group of "exposed" and "nonexposed" veterans, the latter showed levels of dioxin

in ppts in their fat tissue, although not to as great an extent as the exposed group (Carr & McNally, 1980). This finding would seem to lend support to authorities that charge that one intervening variable in the Agent Orange issue is the extent to which all of us might have levels of dioxin in our body as a result of living in a chronically polluted environment.

Given that an individual did have exposure to Agent Orange verified, perhaps on the basis of his military job, to what degree is he entitled to compensation? Does he only receive compensation if he manifests certain symptoms such as chloracne, despite the fact that he was known to have suffered exposure to Agent Orange? Must he develop symptoms within a certain period of time post-Vietnam in order to qualify for benefits? Should he receive more compensation for his "heavy exposure" to Agent Orange than his peer who received "light exposure" but has been nearly crippled by the symptoms that he has been experiencing? Should compensation extend to the exposed veteran's family, in particular his birth-defective child, who was born post-Vietnam?

What would be the overall political and economic ramifications if the Federal government admitted culpability in the Agent Orange issue? Billions of dollars would be disbursed for compensation. Perhaps a new federal agency would be required to adjudicate Agent Orange-related claims. If the government admitted liability to the Vietnam veteran, what of its responsibility to the Vietnamese population, here and abroad? How quickly would the United States face genocide charges before the international community, accused

of violating the Geneva Accords prohibition of chemical warfare?

How could a conclusive link ever be established between dioxin and health effects, given the range of individual variation? The public outcry against the proposed ban of saccharine several years ago is an example. It would seem that some group always has a vested economic interest in maintaining any given policy, no mattern what the cost to human health. Any individual or organization that relies on 2,4,5-T as a weed control agent for crops is bound to oppose any measure to restrict the use of dioxins.

These are just some of the questions raised as a result of the Agent Orange controversy. In spite of the complexities of the issue, the potential health effects of thousands of Americans cannot be disregarded.

# APPENDIX B

# DIAGNOSTIC CRITERIA FOR DEPRESSION AND POSTTRAUMATIC STRESS DISORDER

The following has been reprinted with written permission of The American Psychiatric Association (American Psychiatric Association. Diagnostic and statistical manual (3rd ed.). Washington, D.C.: Author, 1980.)

Major Depressive Episode

The essential feature is either a dysphoric mood, usually depression, or loss of interest or pleasure in all or almost all usual activities and pastimes. This disturbance is prominent, relatively persistent, and associated with other symptoms of the depressive syndrome. These symptoms include appetite disturbance, change in weight, sleep disturbance, psychomotor agitation or retardation, decreased energy, feelings of worthlessness or guilt, difficulty concentrating or thinking and thoughts of death or suicidal attempts.

An individual with a depressive syndrome will usually describe his or her mood as depressed, sad, hopeless, discouraged, down in the dumps, or in terms of some other colloquial variant. Sometimes, however, the mood disturbance may not be expressed as a synonym for depressive mood but rather as a complaint of "not caring anymore," or as a painful inability to experience pleasure. In a child with a depressive syndrome there may not be complaints of any dysphoric mood, but its existence may be inferred from a persistently sad facial expression.

Loss of interest or pleasure is probably always present in a major depressive episode to some degree, but the individual may not complain of this or even be aware of the loss, although family members may notice it. Withdrawal from friends and family and neglect of avocations that were previously a source of pleasure are common.

Appetite is frequently disturbed, usually with loss of appetite, but occasionally with increased appetite. When loss of appetite is severe, there may be significant weight loss or, in the case of children, failure to make expected weight gains. When appetite is markedly increased there may be significant weight gain.

Sleep is commonly disturbed, more frequently with insomnia present, but sometimes with hypersomnia. The insomnia may involve difficulty falling asleep (initial insomnia), waking up during sleep and then returning to sleep only with difficulty (middle insomnia), or early morning awakening (terminal insomnia).

Psychomotor agitation takes the form of inability to sit still, pacing, handwringing, pulling or rubbing of hair, skin, clothing, or other objects, outbursts of complaining or shouting, or pressure of speech. Psychomotor retardation may take the form of slowed speech, increased pauses before answering, low or monotonous speech,

slowed body movements, a markedly decreased amount of speech (poverty of speech), or muteness. (In children there may be hypoactivity rather than psychomotor retardation.) A decrease in energy level is almost invariably present, and is experienced as sustained fatigue even in the absence of physical exertion. The smallest task may seem difficult or impossible to accomplish.

The sense of worthlessness varies from feelings of inadequacy to completely unrealistic negative evaluations of one's worth. The individual may reproach himself or herself for minor failings that are exaggerated and search the environment for cues confirming the negative self evaluation. Guilt may be expressed as an excessive reaction to either current or past failings or as exaggerated responsibility for some untoward or tragic event. The sense of worthlessness or guilt may be of delusional proportions.

Difficulty in concentrating, slowed thinking, and indecisiveness are frequent. The individual may complain of memory difficulty and appear easily distracted.

Thoughts of death or suicide are common. There may be fear of dying, the belief that the individual or others would be better off dead, wishes to die, or suicidal plans or attempts.

Associated features. Common associated features include depressed appearance, tearfulness, feelings of anxiety, irritability, fear, brooding, excessive concern with physical health, panic attacks, and phobias.

When delusions or hallucinations are present, their content is usually clearly consistent with the predominant mood (mood-congruent). A common delusion is that one is being persecuted because of sinfulness or some inadequacy. There may be nihilistic delusions of world or personal destruction, somatic delusions of cancer or other serious illness, or delusions of poverty. Hallucinations, when present, are usually transient and not elaborate, and may involve voices that berate the individual for his or her shortcomings or sins.

Less commonly the content of the hallucinations or delusions has no apparent relationship to the mood disturbance (mood-incongruent). This is particularly the case with persecutory delusions, in which the individual may be at a loss to explain why he or she should be the object of persecution. The usefulness of the distinction between mood-congruent and mood-incongruent psychotic features is controversial.

Age specific associated features. Although the essential features of a major depressive episode are similar in infants, children, adolescents and adults, there are differences in the associated features.

In prepubertal children separation anxiety may develop and cause the child to cling, to refuse to go to school, and to fear that he or she or the parents will die. A previous history of separation anxiety may result in more intense anxiety symptoms with the onset of a major depressive episode.

In adolescent boys negativistic of frankly antisocial behavior may appear. Feelings of wanting to leave home or of not being understood and approved of, restlessness, grouchiness, and aggression are common. Sulkiness, a reluctance to cooperate in family ventures, and withdrawal from social activities, with retreat to one's room, are frequent. School difficulties are likely. There may be inattention to personal appearance and increased emotionality, with particular sensitivity to rejection in love relationships. Substance abuse may develop.

In elderly adults there may be symptoms suggesting Dementia, such as disorientation, memory loss, and distractibility. Loss of interest or pleasure in the individual's usual activities may appear as apathy; difficulty in concentration as inattentiveness. These symptoms make the differential diagnosis of "pseudodementia" (due to depression) from true Dementia (an Organic Mental Disorder) particularly difficult (p. 111).

Differential diagnosis of major depressive episode. An Organic Affective Syndrome with depression may be due to substances such as reserpine, to infectious diseases such as influenza, or to hyperthyroidism. Only by excluding organic etiology can one make the diagnosis of a major depressive episode. For further discussion, see p. 117.

Primary Degenerative Dementia or Multi-infarct Dementia, because of the presence of disorientation, apathy and complaints of difficulty concentrating or of memory loss, may be difficult to distinguish from a major depressive episode occurring in the elderly. If the features suggesting a major depressive episode are at least as prominent as those suggesting Dementia, it is best to diagnose a major depressive episode and assume that the features suggesting Dementia represent a pseudo-dementia that is a manifestation of the major deprssive episode. In such cases the successful treatment of the major depressive episode often results in the disappearance of the symptoms suggesting Dementia. If the features suggesting Dementia are more prominent than the depressive features, the diagnosis should be the appropriate form of Dementia, but the presence of depressive features should be noted.

If a psychological reaction to the functional impairment associated with a physical illness that does not involve the central nervous system causes a depression that meets the full criteria for a major depressive episode, the Major Depression should be recorded on Axis I, the physical disorder to Axis III, and the severity of the psychosocial stressor on Axis IV. Examples would include the psychological reaction to the amputation of a leg or to the development of a life-threatening or incapacitating illness.

In Schizophrenia there is usually considerable depressive symptomatology. If an episode of depression follows an episode of Schizophrenia and is superimposed upon the residual phase of Schizophrenia, the additional diagnosis of either Atypical Depression or Adjustment Disorder with Depressed Mood may be made, but not Major Depression. An individual with a major depressive

episode may have psychotic symptoms; however, the diagnosis of Schizophrenia is made in the presence of a full depressive syndrome only if the affective symptoms follow the psychotic symptoms or are brief relative to the duration of the psychotic symptoms. An individual with Schizophrenia, Catatonic Type, may appear to be withdrawn and depressed and it may be difficult to distinguish this condition from Major Depression with psychomotor retardation. In such instances it may be necessary to rely on features that on a statistical basis are associated differentially with the two disorders. For example, the diagnosis of a major depressive episode is more likely if there is a family history of Affective Disorder, good premorbid adjustment, and a previous episode of affective disturbance from which there was complete recovery.

The diagnosis of Schizoaffective Disorder can be made whenever the clinician is unable to make a differential diagnosis between a major depressive episode and Schizophrenia. Although no criteria for Schizoaffective Disorder are provided in this manual, several examples of clinical situations in which this diagnosis might be appropriate are given on p. 202.

In Dysthymic and Cyclothymic Disorders there are features of the depressive syndrome, but they are not of sufficient severity and duration to meet the criteria for a major depressive episode. However, in some instances, a major depressive episode is superimposed on one of these disorders. In such cases both diagnoses should be recorded since it is likely that after recovering from the major depressive episode, either a Dysthymic or a Cyclothymic Disorder will persist.

Chronic mental disorders such as Obsessive Compulsive Disorder or Alcohol Dependence, when associated with depressive symptoms may suggest a Major Depression. The additional diagnosis of Major Depression should be made only if the full depressive syndrome is present and persistent. In such instances both the chronic mental disorder and the superimposed Major Depression should be recorded.

In Separation Anxiety Disorder, depressive symptoms are common, but if the full depressive syndrome is not present, only Separation Anxiety Disorder should be diagnosed. On the other hand, children with Separation Anxiety Disorder may develop a superimposed major depressive episode, in which case both diagnoses should be made.

Uncomplicated Bereavement is distinguished from a major depressive episode and is not considered a mental disorder even when associated with the full depressive syndrome (see p. 333). However, if bereavement is unduly severe or prolonged, the diagnosis may be changed to Major Depression.

Diagnostic criteria for major depressive episode

A. Dysphoric mood or loss of interest or pleasure in all or almost all usual activities and pastimes. The dysphoric mood is characterized by symptoms such as the following: depressed, sad, blue, hopeless, low, down in the dumps, irritable. The mood disturbance

must be prominent and relatively persistent, but not necessarily the most dominant symptom, and does not include momentary shifts from one dysphoric mood to another dysphoric mood, e.g., anxiety to depression to anger, such as are seen in states of acute psychotic turmoil. (For children under six, dysphoric mood may have to be inferred from a persistently sad facial expression.)

B. At least four of the following symptoms have each been present nearly every day for a period of at least two weeks (in children under six, at least three of the first four).

(1) poor appetite or significant weight loss (when not dieting) or increased appetite or significant weight gain (in children under six consider failure to make expected weight gains)
(2) insomnia or hypersomnia
(3) psychomotor agitation or retardation (but not merely subjective feelings of restlessness or being slowed down) (in children under six hypoactivity)
(4) loss of interest or pleasure in usual activities, or decrease in sexual drive not limited to a period when delusional or hallucinating (in children under six, signs of apathy)
(5) loss of energy; fatigue
(6) feelings of worthlessness, self-reproach, or excessive or inappropriate guilt (either may be delusional)
(7) complaints or evidence of diminished ability to think or concentrate, such as slowed thinking, or indecisiveness not associated with marked loosening of associations or incoherence
(8) recurrent thoughts of death, suicidal ideation, wishes to be dead, or suicide attempt.

C. Neither of the following dominate the clinical picture when an affective syndrome (i.e., criteria A and B above) is not present, that is, before it developed or after it has remitted:

(1) preoccupation with a mood-incongruent delusion or hallucination (see definition below)
(2) bizarre behavior

D. Not superimposed on either Schizophrenia, Shizophreniform Disorder, or a Paranoid Disorder.

E. Not due to any Organic Mental Disorder or Uncomplicated Bereavement.

Fifth-digit code numbers and criteria for subclassification of major depressive episode

(When psychotic features and Melancholia are present the coding system requires that the clinician record the single most clinically

significant characteristic.)

6-- In Remission. This fifth-digit category should be used when in the past the individual met the full criteria for a major depressive episode but now is essentially free of depressive symptoms or has some signs of the disorder but does not meet the full criteria.

4-- With Psychotic Features. This fifth-digit category should be used when there apparently is gross impairment in reality testing, as when there are delusions or hallucinations, or depressive stupor (the individual is mute and unresponsive). When possible, specify whether the psychotic features are mood-congruent or mood-incongruent. (The non-ICD-9-CM fifth-digit 7 may be used instead to indicate that the psychotic features are mood-incongruent; otherwise, mood-congruence may be assumed.)

> Mood-congruent Psychotic Features. Delusions or hallucinations whose content is entirely consistent with the themes of either personal inadequacy, guilt, disease, death, nihilism, or deserved punishment; depressive stupor (the individual is mute and unresponsive).
>
> Mood-incongruent Psychotic Features. Delusions or hallucinations whose content does not involve themes of either personal inadequacy, guilt, disease, death, nihilism, or deserved punishment. Included here are such symptoms as persecutory delusions, thought insertion, thought broadcasting, and delusions of control, whose content has no apparent relationship to any of the themes noted above.

3-- With Melancholia. Loss of pleasure in almost all activities, lack of reactivity to usually pleasurable stimuli (doesn't feel much better, even temporarily, when something good happens), and at least three of the following:

> (a) distinct quality of depressed mood, i.e., the depressed mood is perceived as distinctly different from the kind of feeling experienced following the death of a loved one
> (b) the depression is regularly worse in the morning
> (c) early morning awakening (at least two hours before usual time of awakening)
> (d) marked psychomotor retardation or agitation
> (e) significant anorexia or weight loss
> (f) excessive or inappropriate guilt

2-- Without Melancholia

0-- Unspecified

## 308.30 Post-traumatic Stress Disorder, Acute

## 309.81 Post-traumatic Stress Disorder, Chronic or Delayed

The essential feature is the development of characteristic symptoms following a psychologically traumatic life event that is generally outside the range of usual human experience.

The characteristic symptoms involve reexperiencing the traumatic event; numbing of responsiveness to, or reduced involvement with, the external world; and a variety of autonomic, dysphoric, or cognitive symptoms.

The stressor producing this syndrome would evoke significant symptoms of distress in most people and is generally outside the range of such common experiences as simple bereavement, chronic illness, business losses, or marital conflict. The trauma may be experienced alone (rape or assault) or in the company of groups of people (military combat). Stressors producing this disorder include natural disasters (floods, earthquakes), accidental man-made disasters (car accidents with serious physical injury, airplane crashes, large fires), or deliberate man-made disasters (bombing, torture, death camps). Some stressors frequently produce the disorder (e.g., torture) and others produce it only occasionally (e.g., car accidents). Frequently there is a concomitant physical component to the trauma which may even involve direct damage to the central nervous system (e.g., malnutrition, head trauma). The disorder is apparently more severe and longer lasting when the stressor is of human design. The severity of the stressor should be recorded on Axis IV (p. 26).

The traumatic event can be reexperienced in a variety of ways. Commonly the individual has recurrent painful, intrusive recollections of the event or recurrent dreams or nightmares during which the event is reexperienced. In rare instances there are dissociativelike states, lasting from a few minutes to several hours or even days, during which components of the event are relived and the individual behaves as though experiencing the event at that moment. Such states have been reported in combat veterans. Diminished responsiveness to the external world, referred to as "psychic numbing" or "emotional anesthesia", usually begins soon after the traumatic event. A person may complain of feeling detached or estranged from other people, that he or she has lost the ability to become interested in previously enjoyed significant activities, or that the ability to feel emotions of any type, especially those associated with intimacy, tenderness, and sexuality is markedly decreased.

After experiencing the stressor, many develop symptoms of excessive autonomic arousal, such as hyperalertness, exaggerated startle response, and difficulty falling asleep. Recurrent nightmares during which the traumatic event is relived and which are sometimes accompanied by middle or terminal sleep disturbance may be present. Some complain of impaired memory or difficulty in concentrating or completing tasks. In the case of a life-threatening trauma shared with others, survivors often describe painful

guilt feelings about surviving when many did not, or about the things they had to do in order to survive. Activities or situations that may arouse recollections of the traumatic event are often avoided. Symptoms characteristic of Post-traumatic Stress Disorder are often intensified when the individual is exposed to situations or activities that resemble or symbolize the original trauma (.e.g., cold snowy weather or uniformed guards for death-camp survivors, hot, humid, weather, for veterans of the South Pacific).

Associated features. Symptoms of depression and anxiety are common, and in some instances may be sufficiently severe to be diagnosed as an Anxiety or Depressive Disorder. Increased irritability may be associated with sporadic and unpredictable explosions of aggressive behavior, upon even minimal or no provocation. The latter symptom has been reported to be particularly characteristic of war veterans with this disorder. Impulsive behavior can occur, such as sudden trips, unexplained absences, or changes in life-style or residence. Survivors of death camps sometimes have symptoms of an Organic Mental Disorder, such as failing memory, difficulty in concentrating, emotional lability, autonomic lability, headache and vertigo.

Age at onset. The disorder can occur at any age, including during childhood.

Course and subtypes. Symptoms may begin immediately or soon after the trauma. It is not unusual, however, for the symptoms to emerge after a latency period of months or years following the trauma.

When the symptoms begin within six months of the trauma and have not lasted more than six months, the acute subtype is diagnosed, and the prognosis for remission is good. If the symptoms either develop more than six months after the trauma or last six months or more, the chronic or delayed subtype is diagnosed.

Impairment and complications. Impairment may either be mild or affect nearly every aspect of life. Phobic avoidance of situations or activities resembling or symbolizing the original trauma may result in occupational or recreational impairment. "Psychic numbing" may interfere with interpersonal relationships, such as marriage or family life. Emotional lability, depression, and guilt may result in self-defeating behavior or suicidal actions. Substance Use Disorders may develop.

Predisposing factors. Preexisting psychopathology apparently predisposes to the development of the disorder.

Prevalence. No information.

Sex ratio and familial pattern. No information.

Differential diagnosis. If an Anxiety, Depressive, or Organic Mental Disorder develops following the trauma, these diagnoses should also be made.

In Adjustment Disorder, the stressor is usually less severe and within the range of common experience; and the characteristic symptoms of Post-traumatic Stress Disorder, such as reexperiencing the trauma, are absent.

Diagnostic criteria for Post-traumatic Stress Disorder

A. Existence of a recognizable stressor that would evoke significant symptoms of distress in almost everyone.

B. Reexperiencing of the trauma is evidenced by at least one of the following:

(1) recurrent and intrusive recollections of the event
(2) recurrent dreams of the event
(3) sudden acting or feeling as if the traumatic event were reoccurring, because of an association with an environmental or ideational stimulus.

C. Numbing of responsiveness to or reduced involvement with the external world, beginning some time after the trauma, as shown by at least one of the following:

(1) markedly diminished interest in one or more significant activities
(2) feeling of detachment or estrangement from others
(3) constricted affect

D. At least two of the following symptoms that were not present before the trauma:

(1) hyperalertness or exaggerated startle response
(2) sleep disturbance
(3) guilt about surviving when others have not, or about behavior required for survival
(4) memory impairment or trouble concentrating
(5) avoidance of activities that arouse recollection of the traumatic event
(6) intensification of symptoms by exposure to events that symbolize or resemble the traumatic event

Subtypes

Post-traumatic Stress Disorder, Acute

A. Onset of symptoms within six months of the trauma.

B. Duration of symptoms less than six months.

Post-traumatic Stress Disorder, Chronic or Delayed
Either of the following, or both:

(1) duration of symptoms six months or more (chronic)
(2) onset of symptoms at least six months after the trauma (delayed). (American Psychiatric Association, 1980).

# APPENDIX C

# QUESTIONNAIRE

THE UNIVERSITY OF UTAH
SALT LAKE CITY, UTAH 84112

COLLEGE OF NURSING
25 SOUTH MEDICAL DRIVE

Dear Veteran:

The University of Utah College of Nursing is conducting a study on the physical and psychological problems of Vietnam veterans and would appreciate your input. This study is the first of its kind to explore all of the factors that can cause bad health in a population of Vietnam veterans. The study is also interested in what you do and where you go when you need health care.

This study will be useful in informing health care professionals of the health care needs of the Vietnam veteran, so that they can better serve you. Also the study's information on the needs of the Vietnam veteran can be useful to the Congressional Veterans' Affairs Committees to help get legislation passed for health and social services for Vietnam veterans.

Enclosed is a questionnaire and a consent form. The consent form states you give us permission to use your answers on the questionnaire as part of the study. Please read it carefully and sign it before answering the questionnaire.

Please read the directions on how to answer the questions very carefully. We would appreciate it if you would fill out the questionnaire before leaving the vet center. It will take 30 minutes or slightly more of your time, depending on your state of health. It is important that you try to answer every question because the results of the study have more weight with as many people as possible responding.

All information will be kept in strictest confidence. Consent forms will be separated from the questionnaires immediately before the answers are read, so that no name will ever be associated with answers.

Thank you very much for your cooperation and your time. Without you, this study is not possible.

Sincerely,

Mary Ellen Connor

In the first section, we are interested in finding out what kinds of health problems you have. The questions are divided into systems of the body (example: eyes and ears, lungs and heart). Most of the questions require a Yes or No response. If you are unable to answer Yes or No, put a question mark next to the boxes so that we know that you have not just missed the question.

A general question is included at the end of each system so that you can state any problem you have with that part of your body. This is to make sure that we haven't missed any of your health problems with the specific Yes or No questions.

It is important for us to know roughly how long a condition has lasted. As time goes by, it is natural for the memory to get hazy about specific dates. Therefore, we are simply asking you to mark before, during, and/or after Vietnam after every Yes response you make.

Example:

| | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|
| Do you often have difficulty breathing? | ☑ yes ☐ no | | | X |

This means you first began having frequent difficulty breathing after Vietnam.

Example:

| | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|
| Do you have an upset stomach? | ☑ yes ☐ no | X | X | X |

This means you first had a frequent upset stomach before Vietnam, still had it during Vietnam, and continued to have it after Vietnam.

NOTICE: If you served multiple tours of duty in Vietnam:

Before Vietnam = before you ever went there
During Vietnam = during any tour you served there
After Vietnam = after you left for the last time

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| The first set of questions are about your head and brain. Please mark the appropriate time box(es) for each Yes response. | | | | | |
| Did you ever have a fit or convulsion (epilepsy)? | ☐ yes | ☐ no | | | |
| Were you ever knocked unconscious? | ☐ yes | ☐ no | | | |
| Have you at times had a twitching of the face, head, or shoulders? | ☐ yes | ☐ no | | | |
| *Do you have a constant numbness or tingling in any part of your body at least once a month? | ☐ yes | ☐ no | | | |
| *Was any part of your body ever paralyzed? | ☐ yes | ☐ no | | | |
| *Do you suffer from severe headaches at least once a month? | ☐ yes | ☐ no | | | |
| *-1 Does pressure or pain in the head make life miserable at least once a month? | ☐ yes | ☐ no | | | |
| Do you have severe dizzy spells at least once a month? | ☐ yes | ☐ no | | | |
| Do you feel faint at least once a month? | ☐ yes | ☐ no | | | |
| Have you fainted more than twice in your life (unrelated to drinking)? | ☐ yes | ☐ no | | | |
| Have you ever had any illnesses, infections, or injuries to your brain that was not mentioned? | ☐ yes | ☐ no | | | |
| If yes, please specify what the problem was _____ | | | | | |
| The following set of questions concerning your eyes and ears. Please mark the appropriate time box(es) for each Yes response. | | | | | |
| Do you wear glasses? | ☐ yes | ☐ no | | | |
| Does your eyesight black out completely at least once a month? | ☐ yes | ☐ no | | | |
| *-1 Is your eyesight ever blurry (apart from not wearing your glasses)? | ☐ yes | ☐ no | | | |
| Do you have bad pains in your eyes at least once a month? | ☐ yes | ☐ no | | | |

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| *Do your eyes pain you when you are in bright light? | ☐ yes | ☐ no | | | |
| Do you see double at least once a month? | ☐ yes | ☐ no | | | |
| *Do your eyes continually blink or water? | ☐ yes | ☐ no | | | |
| *Are your eyes red or inflamed at least once a month? | ☐ yes | ☐ no | | | |
| Have you ever had any other problems with your eyes? | ☐ yes | ☐ no | | | |
| If yes, please state what kind _____ | | | | | |
| *Are you hard of hearing? | ☐ yes | ☐ no | | | |
| If yes, do you use a hearing aid? | ☐ yes | ☐ no | | | |
| *-1 Do you have pain in your ears at least once a month? | ☐ yes | ☐ no | | | |
| Have you ever had a bad running ear? | ☐ yes | ☐ no | | | |
| *-1 Do you have constant noises in your ears? | ☐ yes | ☐ no | | | |
| Have you ever had any other problems with your ears? | ☐ yes | ☐ no | | | |
| If yes, what kind? _____ | | | | | |
| Next we'd like to ask you some questions about your mouth, nose, and throat. Please mark the appropriate time box(es) for each Yes response except #1 and #2. | | | | | |
| Do you have to clear your throat frequently in the course of a day? | ☐ yes | ☐ no | | | |
| Do you often have trouble swallowing? | ☐ yes | ☐ no | | | |
| If yes, ☐ with solids only ☐ with liquids only ☐ both | | | | | |
| Do you often feel a choking lump in your throat? | ☐ yes | ☐ no | | | |
| Do you get sore throats at least once a month? | ☐ yes | ☐ no | | | |
| Do you catch severe colds at least once a month? | ☐ yes | ☐ no | | | |
| Do you have a sore mouth or tongue at least once a month? | ☐ yes | ☐ no | | | |
| Have you lost more than half of your teeth? | ☐ yes | ☐ no | | | |
| Are you troubled by bleeding gums? | ☐ yes | ☐ no | | | |
| Do you suffer from a constantly running nose? | ☐ yes | ☐ no | | | |
| Is your nose continually stuffed up? | ☐ yes | ☐ no | | | |
| Have you at times had bad nose bleeds? | ☐ yes | ☐ no | | | |

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| Do you suffer from hayfever? | ☐ yes | ☐ no | _____ | _____ | _____ |
| Have you ever had any other problems with your mouth, nose, and throat? | ☐ yes | ☐ no | _____ | _____ | _____ |
| If yes, what type of problem? _____ | | | | | |

Since you returned from Vietnam:

1. Have you noticed a change in your sense of taste? ☐ yes ☐ no
   If yes, is it: ☐ increased? * ☐ decreased?
2. Have you noticed a change in your sense of smell? ☐ yes ☐ no
   If yes, is it: ☐ increased? * ☐ decreased?

The following group of questions are about your skin. Please mark the appropriate time box(es) for each Yes response except #3, #4 and #5.

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| *-1 Do cuts in your skin usually stay open a long time? | ☐ yes | ☐ no | _____ | _____ | _____ |
| *-1 Do you get bruises the size of a quarter or larger at least once a month? | ☐ yes | ☐ no | _____ | _____ | _____ |
| Are you bothered by severe itching at least once a month? | ☐ yes | ☐ no | _____ | _____ | _____ |
| Do you often have an acne-like rash on your skin? | ☐ yes | ☐ no | _____ | _____ | _____ |
| If yes, does the rash have blisters? ☐ yes ☐ no | | | | | |
| Do you have any other chronic problems with your skin? | ☐ yes | ☐ no | _____ | _____ | _____ |
| If yes, what kind of a problem? _____ | | | | | |

Since you returned from Vietnam:

3. Have you noticed that your skin is more sensitive to sunlight? ☐ yes ☐ no
4. Have you noticed any areas of color change on your skin? ☐ yes ☐ no
   If yes, are they: ☐ lighter? * ☐ darker?

*-1 5. Have you noticed any change in the hair pattern on your body? ☐ yes ☐ no
   If yes, is there: ☐ more? ☐ less?

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| The following group of questions concern your muscles, bones, and joints. Please read instructions carefully. | | | | | |
| *Do your legs give out on you at least once a month? | ☐ yes | ☐ no | | | |
| *-1 Do you get twitching in your muscles at least once a month? | ☐ yes | ☐ no | | | |
| Do pains in the back make it hard for you to keep up with your work? | ☐ yes | ☐ no | | | |
| *Do you often have trouble keeping your balance when you walk? | ☐ yes | ☐ no | | | |
| Have you ever had any of the following problems: [For every box you check, check the appropriate time box(es).] | | | | | |
| ☐ rheumatism (arthritis) | | | | | |
| ☐ broken bones, please specify _____ | | | | | |
| ☐ cysts or tumors in your bones | | | | | |
| ☐ diseases of the muscles that cause severe weakness | | | | | |

The next three questions are about your joints. For every "Yes" answer, mark the joint or joints that are affected by placing a checkmark under the letters a, b, or c in the boxes. Make sure you also check the time box(es).

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| a. Are your joints swollen at least once a month? | ☐ yes | ☐ no | | | |
| b. Do you have pain in your joints at least once a month? | ☐ yes | ☐ no | | | |
| c. Do your joints constantly feel stiff? | ☐ yes | ☐ no | | | |

If yes, which joints:

| | a | b | c |
|---|---|---|---|
| neck | | | |
| shoulders | | | |
| elbows | | | |
| wrists | | | |
| fingers | | | |
| hips | | | |
| knees | | | |
| ankles | | | |
| toes | | | |

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| Do you have any other problems with your muscles or bones that we have not mentioned? | ☐ yes | ☐ no | | | |
| If yes, please specify _____ | | | | | |
| The next set of questions concerns your lungs and heart. Please mark the appropriate time box(es) for each Yes response. | | | | | |
| Are you troubled by constant coughing? | ☐ yes | ☐ no | | | |
| Have you ever coughed up blood? | ☐ yes | ☐ no | | | |
| Do you sometimes have sweats at night that soak your sheets? | ☐ yes | ☐ no | | | |
| Have you ever had any of these lung diseases: (Remember to mark the time box for each disease you check.) | | | | | |
| ☐ pneumonia | | | | | |
| ☐ asthma | | | | | |
| ☐ TB (tuberculosis) | | | | | |
| ☐ lung cancer or tumors | | | | | |
| Have you ever had any other problems with your breathing or your lungs that we have not mentioned? | ☐ yes | ☐ no | | | |
| If yes, please specify _____ | | | | | |
| Do you get pains in or around your heart? | ☐ yes | ☐ no | | | |
| Are you bothered by your heart skipping and/or a fluttery feeling in your chest at least once a week? | ☐ yes | ☐ no | | | |
| Does your heart race like mad at least once a week? | ☐ yes | ☐ no | | | |
| Do you have difficulty breathing at least once a week? | ☐ yes | ☐ no | | | |

| | | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|---|
| | Do you get out of breath doing even light work? | ☐ yes | ☐ no | | | |
| | Do you sometimes get out of breath just sitting still? | ☐ yes | ☐ no | | | |
| | Are your ankles badly swollen at least once a month? | ☐ yes | ☐ no | | | |
| *-1 | Do cold hands or feet trouble you even in hot weather? | ☐ yes | ☐ no | | | |
| | Do you suffer from cramps in your legs at least once a week? | ☐ yes | ☐ no | | | |
| | Has a doctor ever told you that your blood pressure is too high? | ☐ yes | ☐ no | | | |
| | Has a doctor ever told you that you have heart trouble? | ☐ yes | ☐ no | | | |
| | If yes, what did he call it? _____ | | | | | |
| | The following group of questions are about your digestive system. Please mark the appropriate time box(es) for each Yes response. | | | | | |
| | *Do you suffer from an upset stomach (indigestion, heartburn) at least once a week? | ☐ yes | ☐ no | | | |
| | *Do you usually feel bloated after eating? | ☐ yes | ☐ no | | | |
| | *Do you usually belch a lot after eating? | ☐ yes | ☐ no | | | |
| | *Other than when you are not feeling well, do you have a poor appetite at least once a week? | ☐ yes | ☐ no | | | |
| | *Are you sick to your stomach to the point of vomiting at least once a week? | ☐ yes | ☐ no | | | |
| | Have you ever thrown up blood? | ☐ yes | ☐ no | | | |
| | *Do severe pains in your belly double you up at least once a week? | ☐ yes | ☐ no | | | |
| *-1 | Do you suffer from loose bowel movements at least once a week? | ☐ yes | ☐ no | | | |
| *-1 | Do you constantly suffer from bad constipation? | ☐ yes | ☐ no | | | |
| | Do you alternate days of loose bowels with days of constipation at least once a month? | ☐ yes | ☐ no | | | |
| | Have you ever had severe bloody diarrhea? | ☐ yes | ☐ no | | | |
| *-1 | Have you ever had jaundice (yellow eyes and skin)? | ☐ yes | ☐ no | | | |

| | | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|---|
| Have you ever had serious* liver or gall bladder disease (includes hepatitis)? | ☐ yes | ☐ no | | | | |
| If yes, what kind? _____ | | | | | | |
| Have you ever had any other problems with your stomach or intestines? | ☐ yes | ☐ no | | | | |
| If yes, what kind? _____ | | | | | | |
| The next set of questions concerns your urinary system and genitalia. Please mark the appropriate time box(es) for each Yes response. | | | | | | |
| Have you ever passed blood while urinating (passing water)? | ☐ yes | ☐ no | | | | |
| Do you have trouble starting your stream when urinating? | ☐ yes | ☐ no | | | | |
| Do you get up every night and urinate? | ☐ yes | ☐ no | | | | |
| During the day, do you usually have to urinate 8 times or more? | ☐ yes | ☐ no | | | | |
| Do you have severe burning pain when you urinate twice a year or more? | ☐ yes | ☐ no | | | | |
| Do you sometimes lose control of your bladder? | ☐ yes | ☐ no | | | | |
| *-1 Has your urine ever been coca-cola colored? | ☐ yes | ☐ no | | | | |
| Has your doctor ever said that you have (Please mark the time box(es) for every disease you check): | | | | | | |
| ☐ kidney disease | | | | | | |
| ☐ bladder disease | | | | | | |
| ☐ disorder of your prostate | | | | | | |
| ☐ syphilis/gonorrhea | | | | | | |
| ☐ other problems of kidneys, bladder, penis, testicles, or prostate, please specify _____ | ☐ yes | ☐ no | | | | |
| Do you often have a discharge from your penis? | ☐ yes | ☐ no | | | | |
| Have you ever had pain in your penis or testicles? | ☐ yes | ☐ no | | | | |
| Have you ever had swelling in your scrotum? | ☐ yes | ☐ no | | | | |

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| The last few questions are about your sexual functioning. Please mark the appropriate time box(es) for each Yes response except for #6-10. | | | | | |
| Have you fathered any children? | ☐ yes | ☐ no | _____ | _____ | _____ |
| If yes, did you have any children with birth defects after you returned from Vietnam? | ☐ yes | ☐ no | | | |
| If no, have you been told by a doctor that you are sterile (unable to father a child)? | ☐ yes | ☐ no | _____ | _____ | _____ |
| Since you were in Vietnam: | | | | | |
| * 6. Have you had trouble in trying to father a child? | ☐ yes | ☐ no | | | |
| *-1 7. Have you had difficulty enjoying a satisfactory sexual relationship? | ☐ yes | ☐ no | | | |
| 8. Have you been bothered by a decrease in sex drive? | ☐ yes | ☐ no | | | |
| 9. Have you often been troubled by the inability to have an erection? | ☐ yes | ☐ no | | | |
| 10. Do you often have trouble maintaining an erection? | ☐ yes | ☐ no | | | |
| The final group of questions in this section concerns your feelings, habits, and general health. There is also a section on your family's health history. Some of the questions may seem to be repetitious. This is just to make sure we have covered all your health problems. Again please make sure you mark the appropriate time box(es) for each Yes response except #11 and #12. | | | | | |
| *Do you get spells of complete exhaustion or fatigue every couple weeks? | ☐ yes | ☐ no | _____ | _____ | _____ |
| *Do you usually get up tired and exhausted in the morning? | ☐ yes | ☐ no | _____ | _____ | _____ |
| *Do you sleep 11 or more hours/day? | ☐ yes | ☐ no | _____ | _____ | _____ |

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| Do you take daily naps? | ☐ yes | ☐ no | | | |
| *Do you have great difficulty falling asleep at night? | ☐ yes | ☐ no | | | |
| *Do you wake up in the middle of the night, unable to return to sleep? | ☐ yes | ☐ no | | | |
| *Do you wake up very early in the morning, not feeling rested, but unable to go back to sleep? | ☐ yes | ☐ no | | | |
| Do you become scared at sudden movements or noises at night? | ☐ yes | ☐ no | | | |
| Do you experience frightening dreams that awaken you out of sleep? | ☐ yes | ☐ no | | | |
| If yes, do these dreams ever relive your Vietnam experiences? | ☐ yes | ☐ no | | | |
| Have you ever had an unexplained weight change of 10 pounds or more? (Please mark the time box(es) for each type of change.) | ☐ yes | ☐ no | | | |
| If yes, was it a: ☐ decrease?* | | | | | |
| ☐ increase? | | | | | |
| ☐ one followed by the other? | | | | | |
| Do you feel unhappy and depressed for weeks at a time? | ☐ yes | ☐ no | | | |
| Does life often look hopeless to you? | ☐ yes | ☐ no | | | |
| Have you ever wished you were dead and away from it all? | ☐ yes | ☐ no | | | |
| Do you find that you are not enjoying activities you once found pleasurable? | ☐ yes | ☐ no | | | |
| *-1 Do you find concentrating difficult? | ☐ yes | ☐ no | | | |
| Is it hard for you to make up your mind? | ☐ yes | ☐ no | | | |
| *Do you have trouble remembering things? | ☐ yes | ☐ no | | | |

If yes, check the box or boxes that represent the gaps in your memory:

- ☐ last week's events
- ☐ last year's events
- ☐ events occurring in Vietnam
- ☐ events that occurred after Vietnam
- ☐ other, please specify _____

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| *Do you have crying spells that seem to come out of the blue? | ☐ yes | ☐ no | | | |
| Do you feel set apart from other people around you? | ☐ yes | ☐ no | | | |
| Do you have to be on your guard even with your friends? | ☐ yes | ☐ no | | | |
| Are you easily upset and irritated? | ☐ yes | ☐ no | | | |
| Are you considered a nervous person? | ☐ yes | ☐ no | | | |
| Do people annoy and irritate you? | ☐ yes | ☐ no | | | |
| Do you often get into a violent rage? | ☐ yes | ☐ no | | | |
| Are you constantly keyed up and jittery? | ☐ yes | ☐ no | | | |
| Do sudden noises make you jump or shake badly? | ☐ yes | ☐ no | | | |
| Do frightening thoughts keep coming back in your mind? | ☐ yes | ☐ no | | | |
| *Do you often become suddenly scared for no good reason? | ☐ yes | ☐ no | | | |
| Do you have trouble expressing affection for friends or family? | ☐ yes | ☐ no | | | |
| Were you ever a patient in a mental hospital or half-way house? | ☐ yes | ☐ no | | | |
| If no, have you ever sought help from a psychiatrist or other therapist for problems in your life? | | | | | |

| | | |
|---|---|---|
| 11. Have you ever felt guilty that you came back from Vietnam while others did not? | ☐ yes | ☐ no |
| 12. Do your family and/or friends feel that your personality has changed since you returned from Vietnam? | ☐ yes | ☐ no |

The next set of questions deal with smoking and drinking. We are most interested in change in your pattern of use as expressed through the time periods of before, during, and after Vietnam as well as presently. Although it may be hard to recall, please check the amount and type of smoking and drinking that best corresponds to your use during each of the four time periods.

A. Have you ever smoked cigarettes, a pipe, or cigars? ☐ yes ☐ no → If no, go on to question B.

If yes, please check the daily amount of each type you used during each of the four time periods.

| | Before Vietnam | During Vietnam | After Vietnam | Presently |
|---|---|---|---|---|
| Cigarettes | | | | |
| ☐ 40 or more (2 packs) | | | | |
| ☐ 30-39 | | | | |
| ☐ 20-29 | | | | |
| ☐ 10-19 | | | | |
| ☐ 4-9 or less | | | | |
| ☐ none | | | | |
| Pipe | | | | |
| ☐ 4 oz. (approx. 2 pouches) | | | | |
| ☐ 2-3 oz. | | | | |
| ☐ 1 oz. or less | | | | |
| ☐ none | | | | |
| Cigars | | | | |
| ☐ 10 cigars or more | | | | |
| ☐ 5-9 cigars | | | | |
| ☐ 1-4 cigars | | | | |
| ☐ none | | | | |

B. Have you ever used alcohol (beer, wine, or hard liquor)? ☐ yes ☐ no

If yes, please check how often you used alcohol during each of the four time periods.

| | Before Vietnam | During Vietnam | After Vietnam | Presently |
|---|---|---|---|---|
| ☐ 1-3 x daily | | | | |
| ☐ 4-6 x/week | | | | |
| ☐ 1-3 x/week | | | | |
| ☐ 3 x/month or less | | | | |
| ☐ none | | | | |

On a typical day that you consumed alcohol during each of the four time periods, how much did you use of each type?

| | Before Vietnam | During Vietnam | After Vietnam | Presently |
|---|---|---|---|---|
| Beer | | | | |
| ☐ 8 cans/glasses or more | | | | |
| ☐ 6-7 cans/glasses | | | | |
| ☐ 4-5 cans/glasses | | | | |
| ☐ 2-3 cans/glasses | | | | |
| ☐ 1 can/glass | | | | |
| ☐ none | | | | |
| Wine | | | | |
| ☐ 8 four-oz glasses (1 qt.) or more | | | | |
| ☐ 6-7 glasses | | | | |
| ☐ 4-5 glasses (1/2 qt.) | | | | |
| ☐ 2-3 glasses | | | | |
| ☐ 1 glass | | | | |
| ☐ none | | | | |
| Hard Liquor | | | | |
| ☐ 8 shots or mixed drinks or more | | | | |
| ☐ 6-7 drinks | | | | |
| ☐ 4-5 drinks | | | | |
| ☐ 2-3 drinks | | | | |
| ☐ 1 drink | | | | |
| ☐ none | | | | |

The next question concerns drug use. Please look at all the drugs listed and mark Yes, if you have used the drug or No, if you have never used it. If you mark Yes, please check the time box(es) that you used the drug. Also mark how often you used the drug before, during and after Vietnam as well as presently. For any time period that you did not use the drug, leave the box(es) blank.

| Have you ever used: | Before Vietnam | | | During Vietnam | | | After Vietnam | | | Presently | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3x/month or less | 1-3x/ week | 1-3x/ daily | 3x/month or less | 1-3x/ week | 1-3x/ daily | 3x/month or less | 1-3x/ week | 1-3x/ daily | 3x/month or less | 1-3x/ week | 1-3x/ daily |
| a. Barbiturates (downers, reds, nembutal, seconal, phenobarbital)? ☐ yes ☐ no | | | | | | | | | | | | |
| b. Tranquillizers, relaxants (librium, valium, thorazine)? ☐ yes ☐ no | | | | | | | | | | | | |
| c. Antidepressants (elavil, tofranil)? ☐ yes ☐ no | | | | | | | | | | | | |
| d. Amphetamines (methamphetamphines, uppers, dexadrine, "speed," benzedrine, ritalin)? ☐ yes ☐ no | | | | | | | | | | | | |
| e. Heroin, methadone? ☐ yes ☐ no | | | | | | | | | | | | |
| f. Other opiates (morphine, demerol, emperin, percodan, dilaudid, pain killers, talwin)? ☐ yes ☐ no | | | | | | | | | | | | |
| g. Sedatives and hypnotics (Quaaludes, placidyl, doriden)? ☐ yes ☐ no | | | | | | | | | | | | |
| h. Cocaine? ☐ yes ☐ no | | | | | | | | | | | | |
| i. Marijuana or hashish? ☐ yes ☐ no | | | | | | | | | | | | |
| j. PCP/phencyclidine ("angel dust")? ☐ yes ☐ no | | | | | | | | | | | | |
| k. Hallucinogens (LSD, mescaline, peyote)? ☐ yes ☐ no | | | | | | | | | | | | |
| l. Inhalants or solvents (glue, gasoline, amyl nitrate ["poppers"])? ☐ yes ☐ no | | | | | | | | | | | | |

| | | | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|---|---|
| The next few questions ask you about your past medical history. All Yes answers should have a time box(es) checked? | | | | | |
| How would you describe your overall state of health? ☐ excellent ☐ good ☐ fair ☐ poor | | | | | |
| Do you take any medicines regularly that were not mentioned earlier? (If you don't know the name, just say what the medicine is for.) | ☐ yes | ☐ no | | | |
| If yes, please specify. | | | | | |
| Do you have any allergies? | ☐ yes | ☐ no | | | |
| If yes, please specify (for each one mark a time box) | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Do you suffer from any chronic disease that we have not mentioned? | ☐ yes | ☐ no | | | |
| If yes, please specify | | | | | |
| Did you ever have an operation | ☐ yes | ☐ no | | | |
| If yes, what kind of operation? | | | | | |
| Did you ever injure yourself so that you needed to go to the doctor that you have not previously reported | ☐ yes | ☐ no | | | |
| If yes, what type of injury was it? | | | | | |

| | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|
| Have you ever been treated for: [please check the time box(es) for every disease you check] | | | |
| ◻ diabetes (sugar in the blood) | _____ | _____ | _____ |
| ◻ thyroid (goiter in the neck) problem | _____ | _____ | _____ |
| ◻ tumor or cancer, please specify _____ | _____ | _____ | _____ |
| ◻ severe anemia (thin blood) | _____ | _____ | _____ |
| ◻ malaria | _____ | _____ | _____ |
| ◻ rheumatic fever | _____ | _____ | _____ |

Has anyone in your family ever had:
- ◻ cancer, please specify type _____
- ◻ glaucoma
- ◻ high blood pressure
- ◻ hardening of the arteries/stroke
- ◻ heart disease
- ◻ asthma
- ◻ TB (tuberculosis)
- ◻ ulcers
- ◻ multiple allergies
- ◻ thyroid problems
- ◻ diabetes
- ◻ epilepsy
- ◻ kidney disease
- ◻ arthritis
- ◻ bleeding disorders

***PLEASE GO BACK AND GLANCE THROUGH YOUR ANSWERS TO SECTION I MAKING SURE YOU HAVE MARKED A YES OR NO FOR EACH QUESTION. ALL YES ANSWERS SHOULD BE MARKED WITH A BEFORE, DURING, AND/OR AFTER VIETNAM TIME BOX UNLESS OTHERWISE SPECIFIED.

II. In the next section, we will be asking you for information on your military service in Vietnam.

1. What branch of the service were you in? _____

2. How long were you in the service? _____

3. When did you serve in Vietnam? from ___ ____ to ___ ____
   mo. year mo. year

4. Where were you stationed?
   If you don't remember any names, please check the map and place an X in the area where you were. (NOTE THAT THE MAP IS A 1968 MAP)

5. What was your military job? _____

6. What was your rank? _____

7. Were you ever injured or wounded in Vietnam? ☐ yes ☐ no
   If yes, what part(s) of your body? _____

8. Did you ever have any disciplinary action taken against you while in Vietnam? ☐ yes ☐ no
   If yes, what type? _____

9. What type of discharge did you get? _____
   If less than fully honorable, what was the reason? _____
   _____
   _____
   Has this discharge since been upgraded? To What? _____
   _____


Note. Adapted from Stellman, J., 1980.

III. In this section we are interested in finding out about your life before you went to Vietnam and since you returned from Vietnam.

1. My age is
   - ☐ 25-35
   - ☐ 36-45
   - ☐ 46-55
   - ☐ 56 or over

2. My ethnic origin is
   - ☐ white
   - ☐ black
   - ☐ Chicano/Hispanic
   - ☐ American Indian
   - ☐ Asian
   - ☐ Other

3. The religious preference I have is:
   - ☐ L.D.S.
   - ☐ Protestant
   - ☐ Catholic
   - ☐ Jewish
   - ☐ Other
   - ☐ No preference

4. My occupation is _____

5. My present employment status is
   - ☐ unemployed-not in school
   - ☐ work part-time
   - ☐ work full-time
   - ☐ in on-the-job training
   - ☐ unable to work due to disability
   - ☐ unemployed while in school

6. Since I returned from Vietnam, I have changed jobs
   - ☐ 1-2 times
   - ☐ 3-4 times
   - ☐ 5-6 times
   - ☐ 7 times or more

7. My annual income is
   - ◻ $5,000 or less
   - ◻ $5,100-$12,000
   - ◻ $12,100-$20,000
   - ◻ $20,100-$30,000
   - ◻ $30,100 and over

8. I have
   - ◻ zero children
   - ◻ 1-2 children
   - ◻ 3-4 children
   - ◻ 5 or more children

9. Before Vietnam, I was
   - ◻ in high school
   - ◻ in college/trade school
   - ◻ unemployed
   - ◻ in the service
   - ◻ working, I had changed jobs
     - ◻1-2 times
     - ◻3-4 times
     - ◻5-6 times
     - ◻7 times or more

10. The highest grade I completed in school (please mark each time box, e.g., you may have different levels of education for each time period).

| | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|
| dropped out of school before high school graduation | | | |
| high school graduate (G.E.D.) | | | |
| vocational, business, or technical school graduate | | | |
| some college training | | | |
| college graduate | | | |
| graduate degree | | | |

11. My current marital status is [please mark the appropriate time box(es)]

□ never married (go on to question #12)

| | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|
| □ widowed | | | |
| □ married (legal or common-law) | | | |
| □ divorced | | | |
| □ separated | | | |

My marital status has changed, i.e. I have become either divorced, separated, widowed, married, or single: [Please mark the time box(es) during which the change(s) occurred. Make sure you have the same number of checks that you marked as an answer.]

| | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|
| □ one time | | | |
| □ two times | | | |
| □ three times | | | |
| □ four times or more | | | |

12. Have you ever been arrested? □ yes □ no

If yes, for what reason or reasons? _____

13. Have you ever been convicted of a crime? □ yes □ no

If yes, please check the crime(s) for which you were convicted and then mark whether this occurred before, during, and/or after Vietnam. Make as many checks as convictions for each crime under the appropriate time period.

| | Before Vietnam | During Vietnam | After Vietnam |
|---|---|---|---|
| shoplifting | | | |
| burglary | | | |
| robbery | | | |
| auto theft | | | |
| assault | | | |
| armed robbery | | | |
| rape/sexual assault | | | |
| murder/manslaughter | | | |
| drug possession | | | |
| intoxication | | | |

IV. In the next section we are interested in finding out what you know about the defoliating herbicides that were sprayed in Vietnam, specifically Agent Orange.

1. Have you heard anything about Agent Orange? ☐ yes ☐ no
   If yes, where did you get your information? (if no, go on to question 3.)
   ☐ newspaper/magazines
   ☐ TV/radio
   ☐ Veterans Administration
   ☐ other veterans
   ☐ friends or family members
   ☐ other

2. Do you believe that you were exposed to Agent Orange?
   ☐ yes ☐ no ☐ don't know → go on to question 3.
   If yes,
   a. Where and when do you believe this took place?
   _____
   b. By what route did this affect you?
      ☐ breathing (air)
      ☐ direct skin contact
      ☐ by food
      ☐ by water
      ☐ other
   c. Do you believe that you now have any illness or symptoms of illness that are a result of Agent Orange exposure?
      ☐ yes, if yes, please specify which ones _____
      ☐ no _____
      ☐ don't know _____

3. Do you believe that you were exposed to any other herbicides while in Vietnam?
   ☐ yes, specify if possible _____
   ☐ no _____
   ☐ don't know _____

V. The final section contains questions on your health care needs, where and how you meet them.

1. Do you have a disability classification with the Veterans Administration
   ☐ Yes, if yes → a) for what injury? _____
   ☐ No b) what percent disability? _____

2. Do you carry a private insurance plan? ☐ yes ☐ no
   If no, are you covered by public assistance health programs (Medicare, Medicaid)? ☐ yes ☐ no

3. When was the last time you went to a health care facility (including mental health, alcohol and drug use counseling)?
   - ☐ six months or less
   - ☐ 7 months-12 months
   - ☐ 13 months-24 months
   - ☐ 25 months-36 months
   - ☐ 37 months or more

4. We would like to know which type(s) of health services you have used in the last year. Please check as many boxes as apply.
   - ☐ routine physical/shots/check-up
   - ☐ mental health care/psychiatric or psychological counseling (in or out of hospital)
   - ☐ doctor's office or clinic treatment of physical illness or injury
   - ☐ hospital treatment (including emergency room) of physical illness or injury
   - ☐ drug or alcohol use treatment/counseling (in or out of hospital)
   - ☐ dental exam
   - ☐ eye exam
   - ☐ Agent Orange screening exam
   - ☐ sexual counseling
   - ☐ family planning advice (includes fertility studies and genetic counseling)
   - ☐ rehabilitation/physical therapy
   - ☐ other, please specify _____

5. When you need health care, do you have a regular doctor or clinic that you use? ☐ yes ☐ no

6. For the health services you have received in the last three years, did you use Veterans Administration (VA) facilities?

- ☐ on all visits
- ☐ on some visits
- ☐ on no visits

If you used all or some VA facilities, please check which ones:

- ☐ hospital inpatient
- ☐ hospital outpatient
- ☐ hospital resident (psychiatric or nursing home care unit)
- ☐ day treatment for drug/ alcohol abuse
- ☐ Agent Orange screening
- ☐ Other, please specify

_____

If you did not use VA facilities please check what facilities you did use:

- ☐ physician's office, specify
  - ☐ general or family practitioner
  - ☐ specialist
  - ☐ psychiatrist
  - ☐ dentist
- ☐ hospital inpatient
- ☐ hospital outpatient (clinic)
- ☐ emergency room
- ☐ health department
- ☐ private health organization (prepaid health plan, health maintenance organization, Planned Parenthood)
- ☐ Other, please specify _____

_____

If you have not used VA facilities, what were your reasons? _____

_____

_____

_____

_____

# APPENDIX D

# PRELIMINARY RESEARCH DATA TO PHASE TWO

Table 29

Selected Descriptive Characteristics of Psychosocial Adjustment

(N=53)

| | N | Percent |
|---|---|---|
| Employment status | | |
| Unemployed - not in school | (12) | 22.0 |
| Work part-time | (11) | 21.0 |
| Work full-time | (25) | 47.0 |
| Unable to work due to disability | (1) | 2.0 |
| Unemployed - in school | (3) | 6.0 |
| Nonresponse | (1) | 2.0 |
| Number of Job Changes Since Vietnam | | |
| 1-2 | (4) | 7.0 |
| 3-4 | (9) | 16.0 |
| 5-6 | (8) | 15.0 |
| 7 or more | (31) | 60.0 |
| Nonresponse | (1) | 2.0 |
| Types of Crime Convictions (N=21) | | |
| Shoplifting | (3) | |
| Burglary | (3) | |
| Robbery | (2) | |
| Assault | (13) | |
| Murder/manslaughter | (1) | |
| Drug possession | (3) | |
| Public intoxication | (9) | |
| Vagrancy | (1) | |
| Total Crimes | (35)[a] | |

[a]This figure does not match the number of respondents who reported being convicted of a crime, thus indicating that some respondents reported more than one crime conviction. All but two of the above crimes were reported in the "after Vietnam" time period.

Table 30

Comparison of Alcohol and Tobacco Use Over Four Time Periods

| | Before Vietnam | | During Vietnam | | After Vietnam | | Present Time | |
|---|---|---|---|---|---|---|---|---|
| | N | Mean | N | Mean | N | Mean | N | Mean |
| Cigarettes | 39 | 1.74 | 34 | 3.41 | 34 | 3.82 | 43 | 3.16 |
| Alcohol | | | | | | | | |
| Beer | 35 | 1.31 | 33 | 2.21 | 33 | 2.85 | 41 | 2.27 |
| Wine | 35 | .26 | 34 | .35 | 34 | .71 | 39 | .10 |
| Hard Liquor | 35 | .29 | 34 | 1.42 | 33 | 2.70 | 39 | 1.46 |

Table 31

Overall Drug Usage According to Popularity

(N = 53)

| | N | Percent |
|---|---|---|
| Marijuana | 42 | 82.0 |
| Tranquilizers | 36 | 69.0 |
| Antidepressants | 33 | 63.0 |
| Barbiturates | 28 | 54.0 |
| Synthetic Opiates/Cocaine[a] | 22 | 44.0 |
| Amphetamines/hallucinogens[a] | 18 | 36.0 |
| Sedatives/hypnotics | 12 | 24.0 |
| Heroin | 10 | 19.0 |
| Inhalants | 8 | 15.0 |
| PCP | 5 | 11.0 |

[a]These multiple drugs should be viewed separately. They are grouped together because the usage values were identical.

Table 32

Relationship Between Reported Number of Post-Vietnam Physiological Symptoms of Potential Agent Orange Exposure and Selected Variables (Kendall Tau)

| | Reported Depression Symptoms Post-Vietnam | Reported Posttraumatic Stress Disorder Symptoms Post-Vietnam | Reported Psychological Symptoms of Agent Orange Exposure |
|---|---|---|---|
| Post-Vietnam Physiological Symptoms of Agent Orange Exposure | .40 * (.001) | .45 * (.001) | .56 * (.001) |

* $p < .05$

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